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Fruit Notes

Prepared by the Fruit Program Committee of the Extension Service

FEBRUARY – MARCH 15, 1955

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FRUIT
Feb 1948 Vol 12 No 2
Horticulture

YOUR POMOLOGY DEPARTMENT

Bailey, John S. - Associate Professor, Research - Stationed at East Wareham
Doing small fruit research on strawberries, blueberries and beach
plums. Mr. Bailey also handles considerable of the small fruits
extension program.

Fish, Almon S. Jr. - Instructor
Teaches small fruits and general fruit growing courses. Mr. Fish
is currently taking the place of Mr. J. F. Anderson who is on leave
for further graduate study.

French, Arthur P. - Head of Department
Does some teaching in Pomology and in Plant Breeding, active in small
fruit variety testing, currently editor of FRUIT NOTES.

Roberts, Oliver C. - Associate Professor
Teacher of pest control, fruit marketing and other departmental
courses. Currently also doing research on fruit marketing.

Southwick, Franklin W. - Professor, Research
Most of his time is spent in research on chemical thinning, pre-
harvest drop, several aspects of storage and nutrition. Also,
teaches in certain advanced courses.

Weeks, Walter D. - Assistant Professor, Research
Active on research in nutrition, root stocks, variety and strain
tests and winter hardiness. Also teaches certain advanced courses.

_____ - Extension Fruit Specialist

We hope to have this position filled before long.

Contributors to this Issue from Supporting Fields

Gilgut, Constantine J. - Extension Plant Pathologist
Wheeler, Ellsworth H. - Extension Entomologist

FRUIT NOTES

February - March 1955

With this issue FRUIT NOTES undergoes a permanent change of leadership for better or for worse. The originator and former compiler, Professor W. H. Thies, has retired as reported in the January issue. His shoes will be hard to fill, but we are actively searching for the right man for the position of Extension Fruit Specialist, so that service to the fruit industry, through FRUIT NOTES and the fruit extension program, may proceed with as little interruption as possible.

Every effort will be made to bring you timely, interesting, and we hope valuable information on a wide variety of aspects of fruit growing. However, your comments, criticisms and suggestions will always be welcome.

Regulations require that the mailing list of such a publication be re-checked periodically. Therefore, sometime before long each of you will receive a request card which must be signed by you and returned if you wish to continue to receive FRUIT NOTES. Otherwise, we are required to drop your name from the FRUIT NOTES mailing list.

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JOB OPPORTUNITIES!!!

The following is quoted from a recent news letter from the Michigan State College, Department of Horticulture: "We have not been able to keep up with the ever-increasing demand for our graduates to fill positions as managers of nurseries, orchards, greenhouses and vegetable farms; as field advisors and technicians and sales personnel with organizations that manufacture chemicals and equipment used in horticultural enterprises; as inspectors, extension and research workers for the State and Federal governments, and so on. The attention of promising high school graduates contemplating college careers should be called to the many possibilities in the field of horticulture."

We have recent letters stating that two other states besides Massachusetts are currently looking for an extension man in fruit. One state has a good opening in fruit research.

There are excellent graduate assistantships open in several states. Three opportunities for a young man to work into an established orchard business have recently come across my desk. For none of these could we offer a single recommendation because of the shortage of Pomology students in recent years. The opportunities are there for the right persons with adequate preparation.

***A.P.French

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THE PLACE OF DWARF APPLE TREES IN COMMERCIAL ORCHARDS

A recent story from Oregon on "Hedgerow Apples" has prompted the writing of this article in order to present our views on the place of dwarf apple trees in commercial orchards.

The hedgerow system of growing apples as described consisted of planting dwarf trees which had been budded on Malling IX rootstocks. The trees were planted in rows 12 feet apart while the distance between trees in the row was four feet. The trees were supported by a three-wire trellis. Pictures of the hedgerow showed that the trees were allowed to develop into a thick, dense row of shoots and foliage. Yields of 1,690 boxes per acre at the end of 7 years were reported for Rome Beauty. Advantages claimed for this system of culture were ease of harvesting, spraying and pruning along with high acre yields.

We have been testing and evaluating Malling rootstocks at the University for the past 25 years. While we have never grown trees on Malling IX in hedgerows, we have had considerable experience with their performance under Massachusetts conditions. In light of this experience, we should like to point out some serious disadvantages in the "hedgerow system" as it applied to Massachusetts conditions.

Our experience with Malling IX has shown that the trees will not tolerate the competition of grass and thus cannot be grown under a sod system of soil management. We do not believe it wise to go back to a cultivation system of soil management for apples in Massachusetts as such a system on our hillside orchards would create a serious problem of soil erosion.

The trees on Malling IX are very shallow rooted and often suffer for water unless irrigation is provided. They are also very easily tipped over unless some method of mechanical support is provided. The need for mechanical support adds extra expense and attention to detail which must be taken into consideration.

While pruning under this system may be somewhat easier, it will be more detailed and may require more man hours per acre. This becomes particularly important as the trees get older, because it is not possible to maintain production without detailed pruning.

The control of apple scab in our humid climate would be extremely difficult in the dense hedgerows, as foliage inside the rows would be difficult to reach with spray materials and it would be very slow in drying.

Dwarf trees on Malling IX are expensive and difficult to obtain. The initial cost in planting an acre of hedgerow trees could easily be so high as to prevent many growers starting such an enterprise. Even a planting distance of 8x12 feet would require 454 trees per acre. This would represent an initial investment of 900 to 1200 dollars per acre for just the cost of the trees alone.

We do not believe that the "Hedgerow System" of growing apples is practical under Massachusetts soil and climatic conditions. In the next issue of FRUIT NOTES the possibilities of semi-dwarf trees for Massachusetts orchards will be discussed.

***W.D.Weeks

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POMOLOGICAL RESEARCH

2. The Influence of Orchard and Post-Harvest
Treatments on the Metabolism of Tree Fruits

From this flowery sounding project title, it has been our objective to determine the influence of orchard fertilizers and spray treatments on the rate of respiration, softening, storage disorders, and marketable life of apples. In addition, we are also concerned with the effect of post-harvest treatments such as wraps, chemical dips and vapors, temperature, variations in atmospheric gases (controlled atmosphere storage) on the various factors mentioned previously. Our basic objective, therefore, is to find ways of slowing the rate of fresh fruit deterioration.

Some information we have gathered while working on this project follows:

1. Excessive use of nitrogen has a pronounced influence on the firmness and rate of ripening of apples. High nitrogen apples, although greener and less ripe looking, are actually softer and keep less well than fruit from trees at a moderate nitrogen level.
2. All our pre-harvest drop hormones hasten ripening to some degree. Some of them cause much more ripening than others. Of the materials being sold in Massachusetts, 2,4,5-TP hastens ripening more than either 2,4,5-TA or NAA. The ripening effect on apples is much more pronounced when the trees are high in nitrogen than when they are growing at a moderate level of nitrogen.
3. Maleic hydrazide applied as a spray is capable of slowing the rate of fruit ripening slightly. One of our hopes is that some day a chemical ripening inhibitor will be found which will significantly lengthen the marketable life of fresh fruit.
4. We have learned many things about controlled atmosphere storage construction and management during the past 3 years following commercial installation of such rooms in this state.

***F.W.Southwick

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Learn and See Thru Your TV

The Massachusetts Extension Service in cooperation with
Station WBZ-TV, Channel 4, Boston, presents -

"Homecoming" - Wednesdays 2:45 - 3:00 PM
A program featuring many suggestions
of special interest to the homemaker.

"Down To Earth" - Saturdays 8:30 - 8:55 AM
For those folks interested in agri-
culture and the problems of the
home gardener.

THE 1954-55 STORAGE SEASON

Fruit Firmness - The presence of too many soft McIntosh in storage seems to be an annual problem. The best ways we know for keeping McIntosh in good shape in storage are:

1. Only apples which are quite firm at harvest are suitable for long storage. Apples testing 14 lbs. or less at harvest time will not keep well beyond Christmas time. McIntosh lose about one pound of firmness about every 3 weeks.
2. Place apples in cold storage the same day they are picked or at least within 24 hours of harvesting. Every day in the orchard at 70°F. takes a week off the marketable life of an apple.
3. Get the apples cooled to 32°F. within 4 or 5 days. This means for some storages more cooling capacity, better stacking methods, and better air circulation. An apple will ripen much more rapidly at 36-40°F. than at 32°F.

Although McIntosh have about a week's marketable life at room temperature after they reach 10 lbs. pressure, McIntosh apples are much better eating at around 12 lbs. In other words, you'll make more friends selling a 12 lb. McIntosh than a 10 lb. one.

A pressure tester is a rather valuable tool for keeping track of the storage condition of apples. There should be many more of them being used today. One costs about \$30.00 but we believe it is worthwhile as an investment. The address of the manufacturer can be provided upon request.

Storage Humidity - The subject has been discussed many times but many storages still have humidity problems. There is a very good atomizer on the market which can be hooked up to the water line and will adequately humidify apple storages. A line strainer and 2 nozzles cost less than \$10.00. A humidity measuring sling psychrometer should be standard equipment in all storages. They may be had for less than \$10.00. Information concerning these items may be had upon request, also. Why have apples which show some shriveling when it can be prevented by proper storage management.

Storage Scald - This year we've been lucky! No great amount of scald has appeared even on Cortland, a very scald susceptible variety. How come? In general, it seems that when we have a cool growing season such as the one just past, scald is much less of a problem than when we have a hot, dry growing season. We are testing mineral oil sprays, as suggested by V. Shutak at the University of Rhode Island, to determine their value on Greening, Cortland and Rome. Since so little scald is developing we shall not bring our treated apples out of storage until March or April when we hope there will be some scald to control.

Controlled Atmosphere Storage - This type of storage seems to be gaining acceptance. We now have capacity for about 40,000 bushels of McIntosh in Massachusetts. It will not surprise us to see our capacity rise to 100,000 bushels or more within the next 2-3 years if results obtained from present rooms are favorable. New York State now has a capacity for more than 500,000 bushels. All rooms operating in this state have been run very well. It now appears that rooms can be made sufficiently gas tight without the use of sheet metal. We are anxious to provide any assistance we can to those interested in constructing such rooms.

***F.W.Southwick

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YOUNG TREES IN AN OLD ORCHARD - When a young tree is planted where an old one is taken out, growth is frequently disappointing. At one time it was thought that a mature tree left something toxic in the soil. But that idea has been very largely discarded. The scanty growth of the young tree is explained in this way: (1) Certain elements may have been depleted leaving a lack of balance in the soil. (2) The organisms which bring about decay of the dead roots require nitrogen and therefore compete with the young tree. (3) If other mature trees with widely ranging root systems remain standing nearby, they also offer serious competition. (4) Use of sulfur in scab control over a period of years lowers the pH to a level unfavorable for the growth of the young tree. After removing an old tree a soil improvement program is frequently essential. This involves more than a mere surface application of lime and a complete fertilizer. These materials incorporated into the soil, plus a rank growth of cover crop will help to restore the depleted soil to its former condition. A year spent in growing fertilized cover crops will be time well spent. If manure is available it can be used to good advantage. The soil must be handled in such a way that the young tree makes good growth from the start. If we allow a young tree to loaf along, making one year's growth in three, we lose both time and money.

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Orchards Old and New - According to J. R. Magness of the USDA, no commercial apple producing area has ever made a reputation for its product from old orchards. He estimates that not more than 4% of the national commercial apple crop is produced in orchards more than 40 years old. To stabilize commercial production and to maintain orchards in a more profitable age group, it is essential that new plantings be made each year and old plantings discarded.

(This statement appeared in the December 1937 issue of FRUIT NOTES. It is just as true today as then.-ED.)

INSECT CONTROL RECOMMENDATIONS FOR 1955

I am happy to report but few changes in our fruit insect control recommendations for 1955. All of you are aware of the extremely rapid introduction of new materials that took place in the years following the end of World War II. This made rather drastic changes in recommendations necessary and oftentimes led to much confusion.

Through the sorting process carried out by you growers in your orchards, as well as by those testing the many materials in their experimental set-ups, much of the chaff has now been separated from the wheat; I feel that we are on much firmer ground when making most of our recommendations.

It should not be overlooked that at least part of the confusion and the necessity for rather extreme changes in our recommendations during the past several years resulted from the appearance of pests not considered important previous to the use of some of our newer materials. You know what I mean when I name red-banded leafroller, yellow mite and 2-spotted mite. This is a strong argument in support of the lead arsenate program for the growers who do not have serious curculio or codling moth problems.

The development of air-blast sprayers and the use of concentrates have influenced greatly some recommendations with respect to the uses of certain materials. As fungicides and methods of combatting diseases are changed, it is often necessary to re-evaluate the insect control program. With the development of each new material there must come a consideration of its compatibility with all the materials with which it may be used or which it may precede or follow.

The changes in recommendations are not arrived at lightly; they are introduced only when it is believed growers will be benefitted.

A great majority of the apple growers in Massachusetts were very successful in controlling insects and mites during the 1954 season. We were helped to some extent by the weather, but I believe that use of the right materials for your particular situation, and their thorough application at the proper time were very important contributing factors in your success. If you are one of those growers who did control insects and mites successfully in your orchards in 1954, I would urge you to use the same materials, timing and application techniques in 1955.

A new program should be used only where it can be shown there is a distinct advantage to you or where some insect or mite has not been well controlled. Try experimental programs on tank-sized or smaller blocks worked out in such a way that you have direct comparisons between the new program and a more standard one.

Now let's consider some of the individual pests and materials, keeping in mind that the ideas expressed here are to give you additional help if the program you have followed has not given satisfactory results.

Rosy Aphid: This aphid caused a great deal of damage on susceptible varieties in 1954; we have no way of knowing whether there will be a repeat performance in 1955. Outstanding control can be obtained with a DN material in the Dormant if the application is thorough. Fortunately, we now have alternative measures such as BHC added to oil or to an early scab spray in Delayed Dormant. Good to excellent control is attainable with a phosphate material such as malathion or TEPP used in 1 or 2 Pre-bloom fungicide sprays. Check your 1955 Spray Chart for compatibilities and details.

Bud Moth: This insect is well controlled by a thorough Dormant application of DNe. It may be handled also with malathion or parathion in a Pre-bloom application. Even minimum concentrations of parathion used in 5th or 6th Cover will provide complete control of the summer brood.

"Superior" Oil: It is advisable to use oil at least once every three years. Many growers are using oil every year and swear by it. The complete omission of oil, every year, may lead to a build-up of San Jose Scale. Also, the lack of oil may hasten the time when you can no longer control red mite with one of the phosphate materials such as TEPP, malathion or parathion because strains resistant to these materials also develop. It is best to try to kill them in several different ways.

There is a new wrinkle to consider. If you plan to use the fungicide, captan, to protect against scab early in the season, then the oil spray must be put on before any green tissue is showing in the buds. Leaves may be severely injured if sprayed with oil and then with captan.

Gypsy Moth: This insect may be more of a problem in 1955 in many orchards in Worcester, Middlesex, Essex and Berkshire counties. Much depends upon how soon the Department of Natural Resources sprays woodlands surrounding your orchard if you are in one of the towns where the gypsy moth reached the outbreak stage in 1954. I would suggest that you be ready to include a pound of DDT-50 in the Pink Spray if there is any evidence that gypsy moth is at a peak or near-peak in your area.

Red-Banded Leafroller: This insect continues to surprise growers with the amount of damage it does during the 3-4 weeks following Petal Fall. To prevent these losses and to reduce the potential for 2nd brood, we are recommending that TDE (DDD) be included with materials used against curculio in either the Petal Fall or 1st Cover Sprays. Please note that with the fungicides, captan and glyodin, only the wettable powder types of TDE are safe, whether it is being used early against 1st brood or late in the season against 2nd brood.

Plum Curculio: Dieldrin has provided excellent control of curculio. The small quantity required, just one-half pound of the 50% powder in 100 gallons, makes it possible to use dieldrin at a saving even though it is absolutely essential that TDE be used with it at least once and that DDT be added to it when codling moth must be controlled. Dieldrin is very toxic to bees; applications to blossoms of any kind being worked actively by bees should be avoided. Methoxychlor also continues to give outstanding control, but may need TDE added to handle moderate to heavy outbreaks of leafroller.

Codling Moth: In Massachusetts DDT still seems effective against this pest although reports of rather high resistance in some strains continue to come in from orchard areas to our west. If you have a codling moth problem and are not satisfied with the control being obtained and you are sure that it is not because of poor timing or the lack of coverage, then you may wish to supplement the DDT with a pound or more of the 25% malathion wettable powder as indicated in the 1955 Spray Chart.

Apple Maggot: This insect continues to be a serious threat. The last several years in particular the appearance of flies late in the season has caused much concern and too much damage. Whether these flies are those which emerge late or whether they are migrants is not well understood, but the fact remains they are flies ready to attack our fruit. It seems absolutely essential that

growers keep very close watch of their susceptible varieties and make use of the regularly recommended sprays or dusts for apple maggot control plus emergency applications of methoxychlor closer to harvest. If organic materials such as DDT, TDE and methoxychlor are depended upon entirely for apple maggot control, then it is unsafe to stretch the interval between applications beyond 10 days.

European Red Mite: Oil used in Delayed Dormant (Dormant in the captan schedule) is still very desirable for the control of this mite. If you want to do a 100% job, this oil application can be supplemented in Pink or in 1st Cover or later by some of the other miticides such as malathion or TEPP. Some trials have been made with ovex (Ovotran, Orthotran, etc.). Results have been excellent. Care must be taken, however, not to overspray and not to exceed the recommended dosages of 1/4 lb. of 50% ovex in Pink and 1st Cover and 1/2 lb. per 100 in any later application.

If no oil is used, then it is very desirable to plan a mite control program using one of the foliage type miticides such as malathion, TEPP or for extensive trial, the ovex mentioned above. Such programs are well outlined in the 1955 Spray Chart.

Two-Spotted Mite: This mite continues to be a problem in orchards on the schedule making full use of organic insecticides. It appears relatively late as compared to red mite and thus is not well controlled with the applications put on during the early part of the season. There is some indication that the full ovex program of four sprays such as Pink, 1st Cover, 3rd Cover and 5th Cover, may also handle two-spotted mite. I am of the opinion that the amount of ovex applied to the ground cover during the process of spraying the trees might have a great deal of influence upon the effectiveness of this program against the 2-spot.

If two-spotted mite does develop and aphids are not a problem under hot, dry conditions, Aramite is one of the most effective materials that can be used. If aphids are also a problem one of the phosphates such as malathion would be more logical.

Demeton (Systox, etc.). This newer phosphate which is described more fully elsewhere in this report, is worthy of limited trial on bearing trees. Its compatibility with other materials that may have been used earlier or will be used along with it, is not well known. This is a good reason for limited trials. For the control of red mite, two-spotted mite and green aphid, demeton may be tried in a single application used late in June or early July at a rate equal to 6-8 ounces per 100 gallons. On young or non-bearing trees, there should be no need for hesitation in the use of demeton to control green aphid or mites. Either BHC or lindane could be used on non-bearing trees and might prove more economical and certainly a lot less hazardous to those applying the material. Demeton must be handled with the same safety precautions necessary with parathion.

Residue Tolerances: For many of our commonly used pesticides definite residue tolerances on harvested crops have been or are being established now by the Federal Department of Health, Education and Welfare. Eventually, it will be unlawful for new pesticides to be sold until a residue tolerance on harvest crops has been established for the material when used for the proposed purpose.

It is important for all growers to understand the significance of this amendment to the Federal Food, Drug and Cosmetic Act. It is even more important for growers to use pesticides in a manner which provides a high degree of pest control while at the same time assuring crops at harvest time free from residues in excess

of established tolerances.

To the best of our knowledge, excessive residues should not result from using any of the products named in the Pest Control Charts if they are applied as recommended.

(This article is used in FRUIT NOTES through the courtesy of the Massachusetts Fruit Growers Association, 1955 Annual Report. --ED.)

***E.H.Wheeler

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S T R A W B E R R I E S

Three new red stele resistant strawberry varieties, Orland, Maine 55 and Monmouth, are suggested for trial in the recent revision of Special Circular No. 212-D available from the Mailing Room or your county extension office. These three varieties appear to be mid-to late-season, high yielder, of better than average quality but not too firm, in limited trials to date. At the moment, Orland looks somewhat better than the other two, but all three should be worthy of trial where red stele is a problem.

Speaking of red stele, a report by E. K. Vaughan, et al. in Phytopathology, October 1954, indicates that Douglas Fir sawdust mulch caused a significant increase in the seriousness of red stele. Under a four inch mulch 36% of the plants were affected by red stele whereas under clean cultivation only 8% were visibly injured. A similar amount of sawdust worked into the soil caused only slight increase in red stele. Since the reason given for more red stele under a sawdust mulch is thought to be lower soil temperature and higher moisture content, one might expect that any kind of sawdust would have the same effect when used as a surface mulch.

Virus-free strawberry plants are being offered for sale by several northeastern nurseries this spring. Pomology Department Sheet No. 12, which may be had for the asking, lists the local sources of such plants of which we know.

***A.P.French

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B E E S A N D G R A P E S

"Grape growers frequently see bees sucking the juice from grapes and there fore blame the bees for destroying their fruit. It has long been known that bees do not have mouth parts which can cut the skin of fruit. In the Bee World (England), G. Giordani, Bologna, Italy, reports experiments which indicate that bees are not capable of damaging smooth skinned fruit, although they will suck the juice of fruit previously damaged by birds, wasps and other insects.

"Giarvarini in 1934 showed that bees in cages died of starvation when grapes were the only source of food, unless the skin had been previously pierced."

***from Wisconsin Horticulture

RECOMMENDATIONS FOR APPLE SCAB CONTROL - 1955

Apple scab can be controlled satisfactorily on a protective schedule with the modern fungicides. In such a program, the fungicide must be applied thoroughly before each rain which is long enough for infection to take place or during such a rain before infection has taken place.

However, there are times when it is not possible to apply a fungicide before an infection rain or, if the fungicide was applied on time, it was washed off by prolonged and heavy rain so that green tissues are no longer protected toward the end of the infection period. Fortunately, there are fungicides and combinations of fungicides which have the ability - called "kickback" - to inactivate the scab organism in the early stages of infection. A knowledge of the fungicides which have "kickback" and the length of time after the beginning of an infection period that such action is effective can be used to advantage in controlling scab.

Finally, if scab has not been prevented or stopped, and scab spots appear on the apple leaves, the grower still has a chance. It is a drastic measure and consists of using a powerful chemical to eradicate or "burn out" the scab spots. Because of the element of risk growers are urged to make a conscientious effort to control scab by protection and use of "kickback" fungicides so that there will be no need for eradication.

There are three basic protective schedules to choose from with variations for "kickback". All of them will give satisfactory scab control is used properly.

Basic Ferbam-Sulfur Schedule

In this program, Ferbam 3/4 lb. is combined with Sulfur at half strength. No sulfur is used in 2nd Cover or later and Ferbam is reduced to 1 lb. here or in 3rd Cover if there is good primary scab or if the weather is dry. Combinations are at half strength each.

	<u>Basic Disease Control</u>	<u>Variations</u>
Delayed Dormant	Ferbam 1-1/2 lbs.	Neutral Copper Fungicides (50%)-1 lb.; 25%-2 lbs.
Up-To-Pink		
Pre Rain	Ferbam plus Sulfur	Ferbam 1-1/2 lbs.
In Rain	Ferbam plus Sulfur	Dichlone plus Ferb. or Sulf. or Dichlone or Sulfur dust
Post Rain		Dichlone 1/2 lb.; Dichlone plus Ferb. or Sulf.; Ferb. plus phenyl mercury.
Pink	Same as Up-To-Pink	
Bloom		
Pre Rain	Ferbam plus Sulfur	Ferbam
In Rain	Ferbam plus Sulfur	Ferbam or Sulfur dust or spray
Post Rain		Ferbam plus phenyl mercury
Calyx	Same as Up-To-Pink	
		For eradication, if needed, phenyl mercury full strength alone.

Basic
Disease Control

Variations

1st Cover	Same as Up-To-Pink Use no phygon here or later. Phenyl mercury alone for eradication.
2nd Cover	Use no Sulfur here or later. Ferbam 1-1/2 lbs. Captan 1 lb. or glyodin 1-1/2 pts. Phenyl mercury for eradication only.
3rd. Cover	Ferbam 1 lb. Captan 1 lb. or glyodin 1-1/2 pts.
4th & 5th Cover	Ferbam 1 lb. Captan 1 lb.
6th & 7th Cover	Captan 1 lb. Glyodin 1-1/2 pts.

Comments on Ferbam-Sulfur program:

Red Delicious and Baldwin - Ferbam only early in season; no dichlone; no sulphur if lead is used before 3rd Cover.

Yellow Delicious: Captan only throughout.

Phenyl mercury eradicator (full strength) may russet Red Delicious, Baldwin and Rhode Island Greening. May be desirable to use at half strength with other fungicide.

Glyodin is left out in 4th and 5th Cover, when lead arsenate will probably be used for insect control, to avoid injury to Cortland, Baldwin, Red Delicious, Rhode Island Greening and Macoun.

Basic Captan Schedule

Captan at 2 lbs. is used as the basic fungicide. To avoid injury from captan and oil, put oil on in Dormant and start captan in Delayed Dormant. Combination at half strength each.

Basic
Disease Control

Variations

Delayed Dormant	Captan 2 lbs.	
Up-To-Pink		
Pre Rain	Captan	
In Rain	Captan	
Post Rain	Captan plus Mercury	Captan plus Dichlone
Pink	Same as Up-To-Pink	
Bloom		
Pre Rain	Captan	
In Rain	Captan	
Post Rain	Captan plus Mercury	
Calyx	Same as Up-To-Pink	
1st Cover	Captan 2 lbs.	Captan plus mercury for "kickback"
2nd Cover	Captan 1 lb.	Captan 2 lbs.
4th through 7th Cover	Captan 1 lb.	

Comments on Captan program:

Excellent fruit finish on all varieties in lead program. Best for Golden Delicious.
Injury is possible, if used after sulfur or dichlone, on Red Delicious and Baldwin. Do not use with or right after oil. Frogeye and leaf yellowing.
For Rusts, use at half strength with half strength ferbam, before rains in Pink, Bloom and Calyx.

Basic Glyodin Schedule

Glyodin is used at 1 qt. and reduced to 1-1/2 pts. in covers and Captan substituted where there is danger from lead arsenate injury. Suppresses red mite if season is started with low mite populations.

	<u>Basic Disease Control</u>	<u>Variations</u>
Delayed Dormant	Ferbam 1-1/2 lbs. if oil is used	Glyodin, if no oil used or Neutral Copper 50% - 1 lb., 25% - 2 lbs.
Up-To-Pink		
Pre Rain	Glyodin 1 qt.	
In Rain	Glyodin 1 qt.	
Post Rain	Glyodin plus Mercury	
Pink)		
Bloom)		
Calyx)	Same as Up-To-Pink	
1st Cover	Glyodin 1 qt.	Glyodin and mercury (1/2 str. each) if needed for "kickback".
2nd & 3rd Cover	Glyodin 1-1/2 pts.	Captan 1 lb.
4th through 7th Cover	Captan 1 lb.	Glyodin 1-1/2 pts. if no lead arsenate is used.

Comments on Glyodin program:

For rusts use ferbam 3/4 lb. with glyodin 1 pt. in pre-rain applications in Pink, Bloom and Calyx.
Do not use on yellow and green varieties nor with lead arsenate in covers on Cortland, Baldwin, Red Delicious, Rhode Island Greening and Macoun.
Mercury eradicant, full strength, may russet Baldwin, Red Delicious, and Rhode Island Greening. May be desirable to use at half strength each, mercury and glyodin.
Glyodin with TEPP or emulsifiable concentrates of insecticides may cause injury.

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(This article is used in FRUIT NOTES through the courtesy of the Massachusetts Fruit Growers Association, 1955 Annual Report. --ED.)

***C.J.Gilgut

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FRUIT NOTES

APRIL 15, 1955

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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Issued by the Extension Service, James W. Dayton, Associate Dean and Director,
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United States Department of Agriculture and County Extension Services cooperating.

Publication Approved by George J. Cronin, State Purchasing Agent, No. 19.



YOUR POMOLOGY DEPARTMENT

Bailey, John S. - Associate Professor, Research - Stationed at East Wareham
Doing small fruit research on strawberries, blueberries and beach
plums. Mr. Bailey also handles considerable of the small fruits
extension program.

Fish, Almon S. Jr. - Instructor
Teaches small fruits and general fruit growing courses. Mr. Fish
is currently taking the place of Mr. J. F. Anderson who is on leave
for further graduate study.

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Does some teaching in Pomology and in Plant Breeding, active in small
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teaches in certain advanced courses.

Weeks, Walter D. - Assistant Professor, Research
Active on research in nutrition, root stocks, variety and strain
tests and winter hardiness. Also teaches certain advanced courses.

_____ - Extension Fruit Specialist

We hope to have this position filled before long.

Contributors To this Issue from Supporting Fields

Henry, Carl B. - U.S. Fish & Wildlife Service

Parmenter, Robert B. - Extension Forester

Shaw, Frank R. - Associate Professor in Entomology & Beekeeping

Wheeler, Ellsworth H. - Extension Entomologist

FRUIT NOTES

April 1955

EXPLANATION OF THE U.S. WEATHER BUREAU'S AGRICULTURAL FORECAST FOR NEW ENGLAND; ALSO DEFINITIONS OF TERMS USED IN WEATHER FORECASTS.

I want to urge each county office to have this information duplicated and sent to all commodity mailing lists.

During April, May and June this information will be of particular use to fruit and vegetable growers. The definition of terms regularly used by the Bureau in its daily forecasts should be of interest to all readers of county publications and to many others as well.

U.S. WEATHER BUREAU AGRICULTURAL FORECAST PROGRAM IN NEW ENGLAND

The purpose of this program is to provide special forecasts for agriculture in order to give the farmer the weather information he needs for planning and conducting his operations. These forecasts are "tailored" to particular operations such as maple sugar production, fruit-tree spraying, crop planting, spraying, dusting or harvesting, frost protection and the like.

The U.S. Weather Bureau forecast center at East Boston issues detailed agricultural forecasts every weekday morning for inclusion on the early farm radio programs. These forecasts cover the New England area which has been divided into convenient "weather" zones. They are also made available to local Weather Bureau Offices in each state and are used as a basis for specialized local forecasts which they issue for use on special farm programs.

The "weather" zones used at present are:

Eastern Massachusetts - from southern tip of Maine south to Cape, and inland 15-20 miles.

South Central N.E. - Most of Conn., R.I., central Mass., including Conn. Valley.

Berkshires - highlands in western Conn., Mass., and southern Vt.

North Central N.E. - southern N.H. except near coast, southeastern Vt.

Northern Vermont - northern half of state.

Northern N.H. - northern half of state.

Maine - subdivided by special local forecast areas.

Radio provides the most adequate means of disseminating these agricultural forecasts. If a radio farm program director decides he does not wish to read these special agricultural forecasts, there is little the Weather Bureau or other federal, state or county employees can do to change his mind. The people who use these forecasts and find them helpful are the ones who can bring pressure on radio stations and farm program directors. Write, call or see them and emphasize your desire to hear those special agricultural forecasts.

Ellsworth H. Wheeler
Extension Entomologist

DEFINITIONS OF WEATHER TERMS

(Prepared by Dr. Oscar Tenenbaum, Meteorologist in Charge, Airport Station)

I. STATE OF SKY

- A) Clear - Sky free or practically free from clouds (average for period less than 1/10 of sky covered).
- B) Cloudy or Overcast - Sky completely covered or nearly so (average for period more than 9/10 of sky covered).

Intermediate conditions between clear and cloudy taken into account by use of the following terms:

- C) Scattered Clouds - Average cloudiness 1/10-5/10 sky covered.
- D) Partly Cloudy - Average cloudiness 3/10-7/10 for period.
- E) Considerable Cloudiness or Mostly Cloudy - Average partly cloudy to overcast for period.

Modifying Terms

Increasing cloudiness - Progressive increase in cloudiness, either in amount of sky covered or in density of cloud layers.

Decreasing cloudiness - Progressive decrease in the amount of sky covered, and/or density of clouds.

Clearing - (in general, used only after precipitation has occurred) - Clearing sky following a period of mostly cloudy weather.

Variable cloudiness - Variable amounts of cloudiness. May range from nearly clear to cloudy or vice versa in a small interval of time.

II. WEATHER

- A) Fair - Broadly speaking, free of precipitation. Usually means not much cloudiness, but can include high thin clouds which do not obscure the sun, moon or stars, but only dim their intensity. In other words, the term ordinarily means sunshine most of the day, and moon or stars visible at night.
- B) Showers - Precipitation intermittent and of short duration. Characterized by suddenness with which precipitation starts and stops and its rapid changes of intensity. Often accompanied by rapid changes between dark, threatening clouds and clearing conditions.
 - 1. General Showers (often indicated by use of word "showers" alone) means that showers are expected over major portion of area.
 - 2. Scattered showers - Showers expected to affect 30-70% of the area.
 - 3. Widely scattered or local showers - Showers expected to affect 30% or less of the area.

- C) Rain - Precipitation of comparatively long duration as distinguished from showers. Precipitation expected over major portion of area,
1. Occasional rain - Precipitation at infrequent intervals and not prolonged, but rather widespread.
 2. Intermittent rain - Precipitation of more or less general and prolonged character but frequently interrupted for short periods.

Modifying Terms for Shower and Rain Forecasts

In Terms of Amount Expected

Very light - less than .03"
Light - less than .10"
Moderate - .10" to .50"
Heavy - more than .50"
Very heavy - more than 1.0"

In Terms of Rate of Accumulation

T* to .10" per hour
.11" to .30" per hour
over .30" per hour

*T indicates a trace of rain, i.e., an amount too small to measure.

- D) Drizzle - Precipitation consisting of numerous tiny droplets which appear to float in the air. Usually accompanied by low, stratus type clouds and fog.
- E) Thunderstorm - When thunder is heard a thunderstorm is considered to be occurring. It may or may not be accompanied by precipitation. If a shower does accompany the thunder it is termed a "thundershower". (Treated similar to showers in forecasts.)
- F) Fog - Minute water droplets suspended in the atmosphere (results in reduced visibility).
- G) Dew or Frost - Widespread liquid or frozen condensation on surface objects. May be modified by the terms "light" or "heavy", or by "killing" in the case of severe frost.

III. TEMPERATURE

In general, temperature forecasts, actual readings (usually maximum and minimum) will be given. However, in trend forecasts for longer periods the following terms apply:

- A) Warmer or not quite so cool - The high or low temperatures during the period will be at least four degrees higher than the comparable extremes occurring during the same period 24 hours before.
- B) Colder, cooler, or not quite so warm - The high or low temperatures during period will be at least four degrees lower than the comparable extremes occurring during the same period 24 hours before.
- C) Little change - High or low temperatures during the period will not differ by more than seven degrees from the comparable extreme occurring during the same period 24 hours before.

IV. WIND

Wind forecasts will include direction and velocity with velocity given in miles per hour.

Modifying Terms Applied to Wind Direction

- A) Variable - Irregular - Usually subject to slow or moderate changes of varying magnitude.
- B) Changeable - Irregular changes of direction of a more decided nature and magnitude than "variable".
- C) Mostly - A modifier used when winds will be subject to some variability, to indicate what direction will predominate.

V. HUMIDITY OR DRYING CONDITIONS

The drying rate is a function of wind velocity, sunshine, temperature and relative humidity. The first three of these elements have already been covered, and the forecaster will combine his forecast of these elements with expected relative humidity to evaluate the drying rate. Drying conditions will then be forecast as being in one of the following classes:

1. Poor drying: 2. Fair drying: 3. Good drying: 4. Excellent drying.

VI. FORECAST PERIOD

- A) "Today" covers today's daylight hours, if the forecast also mentions this evening or tonight. When the latter two are not mentioned, "today" covers the period until midnight tonight.
- B) "Tonight" covers the hours of darkness, or from sunset to sunrise.
- C) "Evening" covers the period from about two hours before sunset to about two hours after sunset.
- D) "Tomorrow" covers the period from about sunrise to sunset the following day, unless the night period is not mentioned. If the night period is not mentioned, "Tomorrow" begins from midnight tonight and ends at sunset tomorrow.
- E) "Forenoon" covers the period from about sunrise until noon.
- F) "Afternoon" covers the period from noon to sunset.

Length of forecast period. The agricultural forecast ordinarily covers the period of today and tomorrow. An outlook for the day after tomorrow is given if the current weather pattern is such that a forecast for the third day can be made with reasonable assurance of verification.

#

HOW TO KEEP THOSE STRAWBERRIES VIRUS-FREE

Almost all strawberry plants growing in the northeast are infected with one or more virus diseases. It is very likely that wild strawberries also are infected.

At least three species of aphids, known to occur in the northeast, serve as virus carriers. After feeding upon diseased plants these aphids may transmit the viruses to healthy, virus-free strawberries. Certain other aphids, also found on strawberries occasionally, have transmitted viruses experimentally.

Virus-free strawberry plants grown for fruiting next season, AND NEXT SEASON ONLY, do not require protection from aphids. Viruses contracted by these plants through aphid feeding should have little or no effect upon their growth or yield.

Plants grown in nurseries for subsequent sale as virus-free plants, MUST BE PROTECTED from aphids in the nursery to keep them in a virus-free condition. This becomes even more important in stock beds from which the nurseryman will set his new stock beds and plant beds for succeeding seasons.

Virus-carrying aphids must not feed on plants which the nurseryman or anyone else wants to keep virus-free.

How Aphids Move From Field to Field

Winged forms are produced in some generations of most aphid species. In strawberry aphids, only the winged forms are able to move from one plant bed to another. (An exception would be the movement of plants, infested with wingless forms, from place to place.)

This Is the Problem

Our problem then is (1) to prevent winged aphids from developing on known virus-infected plants or on plants which may have virus, and (2) to prevent any winged aphids that do develop on such plants from establishing colonies or even feeding upon our virus-free plantings.

What the Nurseryman Can Do

Winged aphids do not travel great distances unless carried by wind or by some other means; therefore:

- (1) Locate virus-free stock and plant beds in places isolated from possible sources of aphids and virus - 3000 ft. is suggested as a reasonably safe distance - any distance is better than none. Such isolation is helpful but distance in itself does not guarantee immunity to aphids and virus.

Winged aphids result when strawberry aphid colony reproduces rapidly and becomes overcrowded. They occur principally during May and June and again in September, October and November. Some may be found during summer months also, therefore:

- (2) Dust all new and old plantings at 12-14 day intervals after growth starts in April and during May and June (except during bloom and within 2 weeks of harvest on fruiting beds.)
- (3) Dust all plantings at 3-4 week intervals during July and August.
- (4) Dust all plantings at 12-14 day intervals during September and October.

The Right Materials to Use

Dusts have proved superior to sprays although this may not hold true under all conditions. Materials must be driven into the buds and under the foliage. Strawberry aphids are found in these places.

- (5) Parathion - 1-2% dust is recommended widely. Observe all Safety Precautions with this material.
- (6) Malathion - 4-5% dust should provide as good control; it will cost more but is much safer for the man doing the job.

Your Equipment Must Be Good

Hand dusters are not adequate on any but the smallest plantings. Power dusters should have nozzles arranged so as to drive the dust into the buds and under the foliage. A trailing canvas apron, 12-20 feet long, to confine the dust increases effectiveness.

Ellsworth H. Wheeler
Extension Entomologist

#

EXCESSIVE CULTIVATION DECREASES GRAPE YIELDS * * * * *

Recent experiments in Ohio show rather conclusively that excessive cultivation is detrimental to high yields in vineyards. Deep plowing and too frequent cultivations tend to cause a compact soil structure, to reduce the water holding capacity of the soil, and to damage the vines by cutting off roots. Discing of the overwintering cover crops in the spring is a more desirable practice than plowing. Three or four light cultivations with a disc are sufficient. Laborious and costly hoeing between the vines in the row can be avoided with two or three spray applications of dinitro. The recommended rate of application is two pints of 55% dinitro-ortho-secondary butyl phenol (Dow General), 10 gallons diesel fuel oil, and water to make 100 gallons. This mixture should be applied at the rate of 50-100 gallons per acre depending on the size and number of weeds. The first application should be made in May when the weeds reach 6-8 inches in height. Repeat applications should be made at three to four week intervals.

O.C.Roberts

#

Look For Mouse Injury

During the past winter there was little, if any, snow covering in most orchard areas. Consequently, fruitgrowers might feel complacent in regard to mouse injury. However, the combination of hurricane-loosened trees and deep-frozen ground increases the need for careful examination of tree bases for signs of girdling. Several quite severe cases of mouse injury have been found in mature orchards, where tall grass, mulch, or weeds have been allowed to accumulate directly against the tree trunks. It is suggested that growers examine trees in susceptible areas in their orchards so that inarching or grafting may be done this spring.

Carl B. Henry

#

THE MCINTOSH OUTLOOK -----

It looks like we can expect a heavy bloom on McIntosh this spring following a rather light crop in 1954. With a big crop in prospect, poorly colored or small apples cannot be expected to be worth much by fall.

This looks like a spring when it would be desirable to use a little less nitrogen than usual to help reduce the tendency for over setting and eventual small, green apples. Also, McIntosh trees which don't over set are much more apt to bloom and produce in 1956. Our data do not indicate that once a tree becomes biennial in bearing heavy applications of nitrogen are going to make the trees annual. In fact, a heavy nitrogen application in the spring of the "on" year, through its tendency to increase the set, may increase the tendency toward alternate bearing. Nitrogen is a very important and essential element in apple raising but when used to excess it will depress red color development, increase fruit drop, and result in a softer, poorer keeping apple also.

If exceptionally good weather exists at blossom time, it might be desirable to take colonies of bees out of the orchard after a day or two of good pollinating weather. Ofcourse, an over set may still occur if wild bees are plentiful.

It is recognized that even if the following suggestions are followed, McIntosh may over set anyway. In this situation chemical thinning seems to represent the best approach to reducing the set and maintenance of annual blooming. For those of you who may be interested in chemical thinning of McIntosh, other apple varieties, and peaches, we have available our 1955 revision of Special Circular #189, "Chemical Thinning of Apples & Peaches". This circular can be obtained from your County Extension office or from the Pomology Department, University of Massachusetts, Amherst upon request.

Apparently, peaches came through in good shape in Massachusetts with little or no winter bud killing.

F.W.Southwick

POMOLOGICAL RESEARCH

3. The Evaluation of Rootstocks
for Tree Fruits

We have been conducting rootstock studies for the past 25 years. It would seem that after 25 years there would not be much left to learn about rootstocks, but when we consider that the life of an apple tree is 35-50 years it is easy to see that rootstock research is by necessity a long time proposition.

Up until the present time we have been concerned with evaluating the performance of our principal apple varieties when grown on the several East Malling rootstocks. We have been looking for a rootstock which would produce a tree $1/2-2/3$ the size of a seedling rooted tree. We also wanted the tree to come into production at an early age and to produce high acre yields.

The results indicate that a few of the Malling stocks appear promising in accomplishing our goal. Malling II and VII produce trees which are $1/2-2/3$ the size of seedling rooted trees. They come into production at an early age and have given high acre yields. There may be a possibility of a weakness with these stocks in that the trees may not be too well anchored.

Malling I is another stock which shows promise. It produces a tree about $3/4$ the size of seedling rootstocks. It comes into production early and is productive and appears to be well anchored.

Malling XVI does not produce a semi-dwarf tree, but is a vigorous stock. It is very productive and appears promising as a stock for weak growing varieties.

In our studies with the semi-dwarfing rootstocks we have found that the vigor of the variety determines to a large extent how much dwarfing effect can be produced by the rootstock. Very vigorous varieties are dwarfed slightly while weak growing varieties may be dwarfed too much by a given rootstock.

We have recently received a new series of semi-dwarfing rootstocks from England which are reported to be superior to the Malling stocks. So it looks like we shall have to start evaluating rootstocks all over again.

Our future studies with rootstocks call for evaluating new rootstocks and determining if the better Malling stocks are practical for the commercial orchard.

W.D. Weeks

#

The Earliest Formed Strawberry Runners Are Money-Makers - Research has shown that the earliest (June-formed) runner plants are the ones which will produce the largest yield the following spring. Early spring planting of mother plants will allow for June runner plant formation. Runner plants then have plenty of time to build up food supply for use in forming blossom buds in fall.

The Moral: Plant your strawberry mother plants early and take care of them.

APPLE VARIETY SURVEY

The American Pomological Society is conducting a nation-wide survey of trends in apple varieties. Before Professor Thies retired he sent a copy of that questionnaire to 25 Massachusetts apple growers. Sixteen growers sent in their reports which he summarized and which is presented below for your information.

Variety	APS Apple Variety Survey			% Increase or Decrease
	Growers Reporting	% Present Planting	% Future Planting	
MdIntosh	16	48	43	- 5
Baldwin	15	15	5	-10
Delicious (Bud Sports)	15	6	16	+10
Cortland	13	7	11	+ 4
Early McIntosh	12	5	8	+ 3
Gallia & Red Rome	12	4	8	+ 4
Red Gravenstein	8	4	6	+ 2
Golden Delicious	7	4	8	+ 4
Macoun	6	4	9	+ 5
Northern Spy	4	4	7	+ 3

Admitted, this represents a very small sampling of Massachusetts apple growers, but at least it suggests the variety trend in future plantings by these growers.

A.P.French

#

* * * * CLEAN UP WEEK * * * *

*Now is the time to get rid of the winter's accumulation of trash and junk - in the attic, basement, barn and other out buildings.

*Let's clean up, not burn up. Inspect your attic, closets and basements, and remove those things that burn fast.

*Dispose of discarded clothing, draperies, rags, furniture, magazines and papers, linoleum and other materials that burn readily.

*Watch especially for oily rags, paint brushes and open containers of flammable apint, thinners or cleaning fluids.

*Stop the use of unsafe wiring - overloaded electrical circuits, worn or frayed cords and defective electrical appliances.

*Remove high brush, weeds, grass and other trash along the roadsides and near your buildings. Remove standing trees, dead trees or limbs that may cause accidents or fires.

*Do not burn debris, trash or other hazardous waste materials outdoors on dry and windy days, or close to your buildings.

*Check your fuses: use 15 ampere fuses in regular household circuits, and don't make any emergency repairs to fuses; keep wiring in good repair; have all the work done by an expert electrician.

*Check your ash receptacles: always put hot ashes into covered metal containers. Hot ashes in wood boxes set fire to many houses. In the cellar, this is particularly hazardous, because flames quickly spread up through hollow walls of the building.

*General repairs: plan needed painting and renovating this spring. Remodel and modernize your house for greater safety. Replace faulty stair treads; install heavy flush type door at the head of the cellar stairs to hold the basement fires in check.

*Don't give fires a place to start. Clean up, and if you must burn brush, grass or trash, select a still, damp day, preferably after 4:00 PM. Have help and fire tools handy. Be sure fire is dead out before leaving it.

<u>Fires result from carelessness</u>	<u>Inspection is the first step in fire prevention</u>	<u>Removal of fire hazards pays dividends</u>	<u>Enlist the cooperation of your neighbors in a clean up campaign</u>
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Robert B. Parmenter
Chairman,
Safety Committee

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A NEW WATER REPELLENT

Preservative for Wooden Boxes, Crates, Etc.

Thanks to modern chemistry, a long-felt need for a safe, inexpensive preservative for use on wood items in contact with foodstuffs, has been filled.

Now it is possible to preserve wooden containers without damaging even the most tender crops. Boxes, hampers, and field crates last much longer. Contamination by fungi and mildew on food handling equipment is practically a thing of the past. And containers keep their new, clean appearance.

This moisture-repellent wood preservative was developed at the request of, and in cooperation with, the National Wooden Box Association and the National Wood Pallet Manufacturers Association.

It is odorless, tasteless, non-toxic. Will not irritate the skin. It really lengthens the life of the containers. Prevents blue stain and similar discoloration of wood, thus insuring a longer lasting clean, bright, sanitary appearance.

How to Apply This Wood Preservative

This wood preservative is purchased in the concentrated form and diluted at the rate of one (1) gallon of the concentrate to two (2) gallons of mineral spirits (Stoddard Solvent).

Treat by any one of the following methods:

1. Dipping - Use an open tank or a 55 gallon drum. For softwoods, a complete immersion of 3-4 seconds is recommended for adequate treatment. For hardwoods, 5-10 seconds is sufficient. Larger items than food

containers require immersion periods ranging from 1 minute upwards.

2. Brushing - Flow the treating solution on liberally rather than brush it on. Keep the brush dripping wet at all times. Two coats are advised on dense woods. After treatment, by any method, allow the solvents to completely evaporate.
3. Spraying - Use spray guns. Be sure to apply a liberal coating to the wood. Apply two coats.

Name of product source will be furnished by the undersigned on request.

Robert B. Parmenter

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LOCAL SUPPLY OF BEES FOR POLLINATION IS SHORT

Winter Losses Heavy: Winter losses of bees have been high. This information comes to us from various parts of Massachusetts and from other New England states as well. Losses have been so heavy as to warrant real concern among fruit growers and others who must depend upon bees for pollination.

Poor Honey Flow in Fall of 1954: Undoubtedly, these excessive losses can be correlated with the poor fall honey flow in many parts of New England last year. The cooler than normal summer and fall, hurricane damage to honey plants, excessive rainfall and long periods of low sunshine were contributing factors to this situation. Colonies went into the winter with an inadequate food supply.

Early Attention Needed to Assure Adequate Supply of Bees for Pollination: It is very likely that bees for hire will be scarce this spring. Fruit growers and others who need bees for pollination are urged to arrange early for their supply of these very necessary insect helpers.

What To Do: Here are some suggestions which may help to solve your problem.

- (1) Contact immediately the beekeeper who has supplied you with colonies in the past. Find out whether he anticipates any trouble supplying your needs.
- (2) If your usual source of supply appears inadequate, ask your county agent for the names of other beekeepers. He is also in a position to bring your needs to the attention of county or other local beekeepers' associations.
- (3) Dealers in beekeeping supplies are often a valuable contact through which you may obtain additional names of beekeepers and some idea of the extent of their apiaries. A list of such dealers has been supplied to each county extension office.
- (4) As an emergency measure, make use of package bees. Package bees are not as efficient as overwintered colonies. They may fail completely unless certain steps are taken to give them every possible chance to perform the job for which you have obtained them. For best results package bees should be installed in hives, fed, and encouraged to develop as far ahead of bloom as possible.

Package bees may be purchased in 2-pound packages for approximately \$3.00 to \$3.75. For larger units, add approximately \$1.00 for each additional pound, exclusive of shipping.

The size package required depends upon several factors: (a) The interval between installation and bloom on the crop to be pollinated. Packages of two to three pounds, if handled properly, are adequate if they are obtained and installed four to six weeks before bloom appears on the crop to be pollinated. If the interval between installation and bloom is less than four weeks, especially if only seven to ten days, five pound units are none too big. The shorter the interval between installation and bloom, the larger the unit must be and also the greater need for a larger number of packages.

(b) The weather during the build-up period is very important; but we don't know what you can do about it. It seems obvious that larger units, and more of them, will overcome the adverse effects of unfavorable weather to some extent.

(c) The availability of nectar and pollen from plants blooming ahead of the crop to be pollinated. Here again, we don't know what you can do about it except to see to it that the colonies are adequately fed as a substitute for the more desirable foods they could obtain from plants.

If you do have to rely on package bees, why not contact local beekeepers and make arrangements with them to secure necessary hives and other equipment as well as some labor and "know-how" so as to assure the best possible returns for the money you have spent to secure the bees. In some areas cooperative arrangements have been worked out to the complete satisfaction of both growers and beekeepers. The growers needing bees, buy the packages; the beekeeper takes charge of them when they arrive, installs them in his hives and then keeps the bees as part-payment for the pollination service.

- (5) Having exhausted all possibility of obtaining an adequate bee supply locally, you may wish to contact beekeepers in other states. Some of these make the rental of colonies for pollination purposes a main part of their business. Transportation costs plus the rental fees may make this an expensive procedure.

Protect the Bees: Do everything possible to avoid unnecessary destruction of bees through the unwise use of insecticides. At times when bees are most active, whether on crop blossoms or on dandelions or other weeds, use those insecticides which are the least toxic to bees.

If you rent bees or have an arrangement with a beekeeper to handle package bees, make sure the owner has ample opportunity to get the bees away from the orchard before applying post-bloom sprays or dusts.

Experiments carried out last year and in many other parts of the country give us no reason to think the aerial spray program carried out for gypsy moth is deleterious to bees to the extent that colonies are greatly weakened or lost.

F.R. Shaw & E.H. Wheeler

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

MAY 15, 1955

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The "Miller Bill" Becomes Effective

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We hope to have this position filled before long.

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Wheeler, Ellsworth H. - Extension Entomologist

FRUIT NOTES

May 1955

HOW CAN WE GET BETTER APPLES TO THE CONSUMER?

This question was the central theme at a recent meeting of the M.F.G.A. Marketing Committee which ran late into the night.

The recent survey of O. C. Roberts (which will be reported at the M.F.G.A. Summer Meeting) shows that altogether too many cut, bruised and otherwise cull Eastern apples are being offered for sale in retail stores. Steps must be taken to correct this situation if our local apples are to retain their rightful place on the market and our Massachusetts apple industry is to survive.

Two approaches to the problem were acted upon by that committee; (1) the preparation of a flyer of suggestions on careful handling to be inclosed in every package; (2) working for compulsory grades for apples. On this second point the committee voted unanimously "that the committee feels that all apples should bear a correct grade label each and every time offered for sale and that we start working for such a law and its enforcement."

Western apples, competition from which will be increasingly keen in years ahead, meet such standards. Why not ours?

***A. P. French

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Summer Fruit Meetings

June 20 - 7 p.m. -- Annual Strawberry Twilight Meeting at the University of Massachusetts. New varieties, virus-free plants and production problems will be stressed.

July 18 - 7 p.m. -- Raspberry-Blueberry Twilight Meeting at the University of Massachusetts. This is the first such meeting to be held on campus. Most of the new varieties will be fruiting (weather permitting).

July 21 - all day -- Summer Meeting of the Massachusetts Fruit Growers Association at President Elmer Fitzgerald's orchards in Leominster. Program to be announced later.

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BLUEBERRY MAGGOT

The blueberry maggot has been noticed in abundance the past few seasons in the fruit of cultivated blueberries in a few fields in the Cape Cod area. Maggot has been a problem to the blueberry industry in other areas for a good many years and there is no reason to believe that it will not be an increasing problem in South-eastern Massachusetts as the industry expands.

The blueberry maggot is a native insect that infests both wild and cultivated blueberries and some related fruits from New Jersey northward wherever its host plants are found. To avoid maggot infested fruit at harvest it has been found necessary to dust or spray for this insect in the cultivated blueberry fields of New Jersey and the areas of wild lowbush blueberries that are harvested in New England and elsewhere.

The blueberry maggot is apparently a strain of the apple maggot, the only difference being that the blueberry infesting strain is smaller in size. This size difference is especially marked in maggots that infest the smaller fruited wild varieties, while maggots developing in some of the larger cultivated blueberry varieties approximate apple maggots in size.

Like the apple maggot the blueberry maggot has one generation a year. The winter is passed in the pupal stage in a quarter inch brown puparia buried in the soil within a few inches of the surface. The flies emerge for about a month in the summer beginning about the time the first blueberries start to turn blue. They are black in color with white bands on the abdomen and are smaller than a house fly though similar in shape. The wings are marked with characteristic oblique black bands. The flies do not lay eggs until about 10 days after they have emerged. Eggs are laid singly under the skin of the blueberry. The eggs hatch in about a week and the maggots leave the berries and enter the soil and form puparia in which they remain until the next or some following spring when they emerge as flies. Some of the maggots remain in the puparia for two or more years before emerging, and as these emerge later than those that emerge after one winter in the soil they complicate control.

Though the flies apparently prefer ripe fruit in which to lay eggs, if they appear before the fruit is ripe or if they are abundant, they will lay eggs in green fruit as well as ripe berries during the harvest season. Consequently the timing of the first dust application is ideally based on fly emergence, but lacking this knowledge the first dust should be applied just as the first few berries are turning from red to blue. Because there is about a 10-day interval between emergence of the fly and the time it can lay eggs, subsequent dustings are applied at 10-day intervals after the first dust application. The number of dusts applied will depend on the length of the harvest season, with three dusts usually a minimum number and four or five being necessary in a late season and with a high percentage of late varieties in the field.

Frequent picking of ripe fruit during the harvest season and prompt disposal of the picked fruit helps in controlling maggot and reducing loss from it. In no case should soft over-ripe fruit be shipped to market, though picking of such fruit and removal from the field will help reduce the fly population the following season. Where practical, bushes should be picked clean as berries left on the bushes at the end of the harvest season often become very heavily infested with maggots and are a source of a large fly population in the next and following seasons.

Since blueberry maggot flies lay their eggs during the picking season of the cultivated blueberry, rotenone sprays or dusts are favored for controlling maggot, because of its safety. A 2% rotenone dust applied by airplane at the rate of 15-20 pounds per acre has given satisfactory control. This can be applied by ground duster also. A spray made up with 5 pounds of 4-5% rotenone wettable powder in 100 gallons of water and applied at the rate of 200 gallons per acre will also give satisfactory control.

***W.E.Tomlinson, Jr.

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IS GRASS INJURING YOUR RASPBERRY YIELD?

Witch or Quack grass is frequently a serious problem in an established red raspberry planting. This and other grasses have been satisfactorily controlled in the planting of Latham and Taylor raspberries according to recent reports from Michigan. A fall application (late October) of Chloro-IPC at the rate of 5-8 lbs. reduced the grass stand by 68 and 76 percent in 1953 and 1954 respectively. This reduction in grass resulted in increased yields of fruit of 30-40 percent. Eight pounds of actual Chloro-IPC should be used in 100 gallons of water and since only the row-areas were sprayed, it should cover about 3 acres with 8 feet row spacing. For the home gardener that means about one ounce of actual Chloro-IPC in one gallon of water to cover a single 40 foot row not over three feet wide.

***A.P.French

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SPECIAL PEST CONTROL MESSAGES

from University of Massachusetts

Special pest control messages to fruit growers, market gardeners, and other crop producers are now being issued for radio broadcast twice each week. These messages are prepared by Ellsworth H. Wheeler, entomologist, and Constantine J. Gilgut, plant pathologist at the University of Massachusetts in Amherst. This is the fourteenth year such special messages have been issued.

Messages are scheduled for release each Tuesday and Friday, and will continue into July or August when the pest control season is pretty well over. Should weather conditions warrant, extra messages will be prepared. The first message was issued on April 15.

Following is a list of radio stations cooperating in special pest control broadcasts and the approximate time when these messages can be heard:

WERK, Pittsfield, 7:05 a.m. and 12:15 p.m.
WHDH, Boston, 5:35 a.m. and 12:45 p.m.
WBZ, Boston, 6:00 a.m.
WBET, Brockton, 11:55 a.m.
WHMP, Northampton, 12:25 p.m.
WTIC, Hartford, Conn., 6:35 a.m.
WTAG, Worcester, 6:15 a.m.
WEEI, Boston, 5:45 a.m.
WHAI, Greenfield, 6:45 a.m.
WMNB, North Adams, 11:45 a.m.
WNBH, New Bedford will use these messages on Wednesdays and Saturdays at 6:35 a.m.

All stations broadcast the agricultural weather forecast prepared especially for farmers by the U.S. Weather Bureau in East Boston. The special messages from the University will follow immediately after these farm weather broadcasts so that growers may plan whatever may be necessary in the way of pest control measures.

***G.O.Oleson

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E L E C T R I C I T Y - Friend or Foe?

Electricity is useful and safe when properly handled. Learn to use it safely. Use electric heaters in bathrooms and laundries with care. People have been killed by touching these electric heaters while they are in the bath. Electric bulbs have been known to explode and start a fire when they are used to dry clothes or to warm the bed. Never allow dust to accumulate on an electric bulb. It may cause it to explode in the barn or the attic and start a fire.

No doubt, you can think of some fire in your neighborhood that has been caused by electric irons, toasters or curling irons having been left connected. Be sure to turn off the switch or disconnect them when leaving the room. This is a must. Keep a sufficient number of 15 amp. fuses on hand to replace those that burn out. Many people are very prone to place pennies and other metals behind the fuse which overloads the circuit and causes a fire.

Be sure that the wiring in the house, particularly the lamp cords, are replaced if badly frayed. Employ an expert electrician to replace wiring in the home.

The other day, I ran across a very excellent safety suggestion for parents and baby sitters. Caution the baby sitter against permitting the child to play with matches or electric appliances. Children have been known to put their fingers into electric light sockets causing a short circuit, badly burning the child, and sometimes causing the death of the child; so caution the baby sitters against allowing the children to play with the fixtures.

In case you found some member of your family unconscious because of electric shock and still in contact with the live wire, what would you do to break the contact? The best and safest method to break such a contact is to knock the wire free or pull the victim away by using a non-conductive materials as a rake, broom, dry branch, dry rope or just the overcoat. Don't, under any circumstances, allow your body to come in contact with the person who's still in contact with the live wire.

***R.B.Parmenter, Chairman-Safety Comm.

A FRESH DISPLAY AN AID TO APPLE SALES

In a retail study of apple displays at Michigan State College it was found that store displays in Detroit, where fresh apples were added daily, sold apples twice as fast as those where fresh apples were added every three days. Furthermore, stores that sold $3/4$ of their display each day, sold 95 pounds of fruit daily. Those that sold a little less than $1/3$ of the display each day sold only 15 pounds of fruit. In other words, this survey emphasizes that a fresh display is an important factor in promoting apple sales.

***O.C. Roberts

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Washington Growers Believe in Advertising

Last year the Washington State Apple Growers contributed 3¢ a box to the Washington State Apple Commission for advertising purposes. By a margin of more than two to one, they have voted to assess themselves an additional 1¢ a box this year. It is anticipated that this will give the Apple Commission an operating income of approximately \$960,000. A part of this additional income is intended for greater promotion of Washington State apples in Eastern markets. It is worthy of note that this advertising campaign will be supported with quality fruit carefully and attractively packed. Bruised apples, jumbled in a crate, are not likely to offer serious competition.

***O.C. Roberts

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REMOVING STRAWBERRY BLOSSOMS

The introduction of virus-free plants is giving the strawberry industry a real "shot in the arm". This is fine but it hasn't solved all of the berry grower's problems. He still has a number to which he would like a prompt and satisfactory solution.

One of these is the time-consuming job of removing the blossoms from newly set strawberry plants. How nice it would be if they could be destroyed by spraying without, of course, hurting the rest of the plant. This has been tried but so far no material has been found which will do the job without reducing the vigor of the plants.

Is blossom removal worth the time and expense it takes? Experimental evidence indicates that it is. It has been proved that early-formed runner plants are more productive than late-formed. Early runner formation increases total runner formation. Therefore, if blossom removal stimulates early runner formation it would increase yield. Data presented by Scott and Marth of the U.S.D.A show that early runner production can be increased very materially by picking off the blossoms. Where no

blossoms were removed, on July 7 the plants averaged 3.3 runners. Where the blossoms were picked off, the plants averaged 19.9 runners, a sixfold increase. They conclude, "The removal of blossoms from newly set strawberry plants is more beneficial in establishment of a vigorous planting than almost any other cultural operation".

On the newly set bed, better keep after those blossoms and keep them picked off.

***J.S.Bailey

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WINTER MULCH ON STRAWBERRIES

This is not the usual time of year to be talking about winter mulch. It wouldn't be mentioned except that during the past winter in one part of the state there was some injury which appears to have resulted, at least in part, from insufficient mulch. As mulching material becomes more difficult to obtain or more expensive, the tendency is to use less and less. If this is carried too far, the mulch ceases to give any winter protection. A series of relatively mild winters may also have led to increased frugality in the use of mulch.

If you haven't already looked for winter injury, now is a good time. Split the crowns of the plants lengthwise. If the tissue inside the crown is brown when cut, the plant has been injured by cold.

Perhaps a heavier winter mulch is indicated. However, remember that weakly, sick plants are more easily injured than strong, vigorous, healthy ones. Start preparing for winter now by keeping the plants strong and healthy.

***J.S.Bailey

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POMOLOGICAL RESEARCH

4. Nature of Winter Hardiness
In the Red Raspberry

The main objective of this project is to try to find out how some raspberry varieties are able to survive colder winter temperatures than others. The mechanism by which raspberry canes are able to survive severe cold is very evasive. Some points of interest which have been observed in the studies so far are: (1) Raspberry varieties differ widely in their resistance to low winter temperatures. During the winter

raspberry canes lose a certain degree of their resistance to low temperatures following several days of mild temperatures. (2) The canes may regain some of their cold resistance if the mild weather is followed by gradual changes to colder weather. (3) Attempts to determine the chemical physical changes which are responsible for the loss and gain of hardiness have not as yet been successful. (4) Injury to the canes which appears the same as winter killing may occur during periods when the ground is frozen and high winds dry out the canes. This type of injury is probably more frequent in years when the ground is frozen to a considerable depth and high winds occur when the temperature is above freezing. This year we had such weather and it probably accounted for much of the observed injury to our raspberry canes. We had more injury to red raspberry canes this past winter than in 1954, although we had lower minimum temperatures in 1954 than in 1955.

The following table compares the cane injury in 1954 and 1955 for some of the varieties in our plantations.

Variety	Per cent of Cane Killed	
	1954	1955
Antietam	5	20
Chief	0	20
Gatineau	5	40
Latham	5	30
Madawaska	0	20
Milton	20	40
September	10	40
Sunrise	0	30
Viking	20	70
Willamette	30	70

We have not found any practical means as yet to reduce the amount of winter injury to red raspberry canes but we have hopes that as we find out more about the nature of winter hardiness we can find ways to reduce the injury.

***W.D.Weeks

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THE "MILLER BILL" BECOMES EFFECTIVE * * * *

* * * * This Story Is for YOU—A Grower

Pesticide residue tolerances and exemptions, as established under Public Law 518 - the "Miller Bill", become effective on July 22, 1955. Every farmer, and especially you who are growing fruits and vegetables, should be aware of this. It can protect you from mistakes. Ignorance of the law is always a poor alibi.

This amendment to the Federal Food, Drug and Cosmetic Act is designed to protect the public welfare - the well being of your consumers. And what's good for the people who buy and eat your products is good for you also.

That is why this Miller amendment was backed by your farm leaders and the pesticide industry as well as by those who believed the consuming public needed more protection against the misuse of pesticide chemicals.

Naturally, the law does not please everyone. Some would prohibit all pesticide: usage on food - let the bugs get fat and the people go hungry rather than use these "dangerous" chemicals. Others see the law as too restrictive, burdensome, perhaps unfair. However, those who have followed closely the developments in pesticides, public attitudes, trends in pest control and legislative proposals, generally agree that this present law is the fairest, most liberal and at the same time the most effective obtainable.

Do You Understand These Terms?

The terms "pesticide" or "pesticide chemical" refer to any one substance of mixture intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, and other forms of plant or animal life or viruses (not viruses in or on man or animals) recognized as pests and which is used in the production, storage or transportation of raw agricultural commodities. These pesticides are "economic poisons". Weed killers, rat killers, insecticides, fungicides, etc., are included.

The term "raw agricultural commodity" means any food in its fresh natural state. It includes all fruits and vegetables, grains, nuts, eggs, meat, raw milk, and similar produce. Fruits and vegetables that have been washed, colored, stripped of outer leaves, waxed, prepackaged, or prepared into fresh salads are included in this definition; everything that you may produce or market before it is frozen, canned, cooked or processed in any way.

"Residue tolerance" means the amount of a pesticide residue allowable on fresh farm produce when ready for interstate shipment. Tolerances are expressed as "parts per million" in or on the product. Individual pesticides are given tolerances which must not be exceeded. Examples are DDT, parathion and chlordane with residue tolerances of 7.0, 1.0 and 0.3 ppm respectively on the crops for which these limits have been established.

Where several related pesticides are used on a crop, the entire residue situation must be considered as well as the residues of each individual material. Dieldrin, methoxychlor, DDT and TDE represent a group of related insecticides; ziram, zineb and ferbam are related fungicides.

Some pesticides have a "zero tolerance". This means that none of such materials may remain in or on the raw agricultural product. Mercury compounds and TEPP are examples.

Some materials have been "exempted". This means that use of these pesticides according to the usual, good, farming practices, does not create a residue hazard - no tolerance figure is needed because the residues commonly present are not harmful. The copper fungicides, rotenone, ryania, and pyrethrum come within this group.

What Does It All Mean?

Just this! All raw(fresh) farm produce moving interstate after July 22, 1955 will be subject to federal inspection for pesticide residues (states may decide to set up similar inspections locally). Such produce can be condemned or confiscated if found to carry, or to contain, pesticide residues exceeding the established tolerances.

The same thing can happen if the product carries the residue of a material for which no "tolerance" or "exemption" has been established as yet.

So! What Do YOU Do?

Keep your shirt on! You are not hurt yet and you don't need to get hurt if you go at your pest control with the right attitude. You have never wanted to kill or endanger any consumer with pesticides - I hope. Well, the Miller Bill will help you to avoid doing it by mistake.

Just follow a few simple rules. You will be more successful in your pest control and less of a hazard to your fellow men.

1. Read and follow labels and official pest control recommendations. Pesticide manufacturers and formulators spend millions of dollars developing products and gathering information with which to prove the truth of statements on their proposed labels. This must be done before the product can be sold interstate.

Now, with the Miller Bill in effect, more millions will be spent to obtain data necessary for the establishment of a "residue tolerance" or "exemption" for each pesticide. This will have to be done before a label can be obtained. And the data must show that the established residue tolerance for the material will not be exceeded on the crops for which it is proposed if used according to directions.

These directions must appear on the label. Read and follow them.

Official pest control recommendations will guide you to successful and safe pest control if you follow them. Authors are human and do make mistakes - another good reason for reading labels. Official charts are your best guide to proper timing and choice of materials - labels give you the safe and effective amounts per acre or per 100 gallons, necessary precautions, proper interval before harvest and crops on which the material may be used.

2. Depend upon a thoroughgoing, preventive pest control program so you won't have to use late emergency measures. Such emergency treatments are always costly and can lead to residue problems. If you do get caught with a pest problem close to harvest get the best available advice. But - don't be surprised if you do not get a good answer. No one in his right mind is going to suggest you use a material which might create a residue problem.

Would you, if you were in his shoes?

***E.H.Wheeler

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- - - WHY RESEARCH? - - -

Research has been characterized as the "yeast" which raises the "dough" for industry's bread. Certainly, research is as fundamental and important to agriculture as to industry, in view of the fact that agriculture has the responsibility of providing food for an ever increasing urban population with a constantly decreasing farm population.

Not all research pays off but that which does, more than pays the bill for all as evidenced by the return of more than one billion dollars a year on a total research investment of about 15 million to develop hybrid corn. Can you imagine where our McIntosh apple industry would be today without the research which has gone into pest control, nutrition and storage? -- ED.



FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

JUNE 15, 1955

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Fish, Almon S., Jr. - Instructor
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French, Arthur P. - Head of Department
Does some teaching in Pomology and in Plant Breeding, active in small fruit variety testing, currently editor of FRUIT NOTES.

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Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also teaches in certain advanced courses.

Weeks, Walter D. - Assistant Professor, Research
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_____ - Extension Fruit Specialist
We hope to have this position filled before long.

FRUIT NOTES

June 1955

LET'S LOOK AT MCINTOSH APPLES IN RETAIL STORES-----

For fifteen years, at least, research workers in the Northeastern states have been studying the merchandizing of McIntosh apples. Numerous recommendations relative to prevention of bruising, methods of packing, and merchandizing in the retail store have been made based on the results of these investigations. The fundamental purpose of these studies has been to provide the consumer with attractive, sound fruit which would result in satisfied customers, increased sales and a stable market for growers of McIntosh apples.

Regardless of the effort that has been made, all too frequently one can still observe in retail stores McIntosh apples that are badly bruised, stem punctured, poorly graded and unattractively displayed. To what extent this condition exists in retail stores in Massachusetts had never been determined.

Therefore, a survey was conducted from October 1954 to January 1955 with several objectives in view, as follows:

1. To determine the grade of McIntosh apples offered for sale.
2. To determine the reasons for apples being below fancy grade.
3. To study methods of handling apples in the stores.
4. To use the results of the survey as basis for further study leading to the improvement of market quality of McIntosh apples.

How the Survey Was Made

During the period of the survey, two hundred samples of apples in one hundred sixty-eight stores were purchased as any customer would purchase them. These samples were obtained from bulk displays, from original containers or from piles of prepackaged fruit, depending upon the method of sale in a particular store. Occasionally, two samples were taken from the same store where different methods of merchandizing were employed. After the samples were obtained, the manager or produce clerk was asked such questions as: From what market source did you get these apples? What kind of a container did they come in? How were they packed? Did you keep them under refrigeration from the time you received them until you put them on display? In addition, notes were taken on the general appearance of the fruit, whether or not the display counter was refrigerated and the like.

As soon as the apples were taken from the store, the temperature was determined and the sample was then placed in a specially constructed sponge rubber lined box and transported by automobile to a refrigerated room at the University in less than twelve hours.

Analyses of the Samples

Within forty-eight hours after being placed in the refrigerated room, each sample was weighed and analyzed as to grade, reason for apples being below "Fancy" grade, number and size of bruises, number of stem punctures, cuts and bruises, firmness and total amount of waste due to bruises, stem punctures and the like.

What's the Score?

When all of the data from two hundred samples consisting of 2223 apples are grouped together, here is the story they tell.

Thirty-three per cent were fancy or above and sixty-seven per cent were below fancy when graded according to U.S. grade standards. If all apples were fancy or better there would be no problem from the standpoint of market quality. Since sixty-seven per cent were below fancy there is a problem and accordingly the apples below fancy grade were analyzed to find out the cause. The relative causes arranged in order of importance are shown in Table I.

Table I. Defects Causing Apples
To Be Below Fancy Grade

Type of Defect	Per Cent Below Fancy
<u>Mechanical</u>	
(Bruises, cuts, stem punctures)	82.7
Color	23.5
Rot	5.1
Shape	4.4
Maturity	3.7
Disease	3.7
Insect	2.7
Russet	1.3
Physiological	0.5

The percentages in this table total more than 100 because some apples were below grade for more than one reason.

These figures clearly indicate that the chief cause for apples being below grade was mechanical injury with lack of color of considerable importance. The percentage of rot was far greater than it should have been.

The relative unimportance of insect and disease blemishes is a tribute to the fruit growers for either they have done a creditable job controlling pests or they have carefully eliminated such blemished fruit on the grading table. Most of the poorly shaped apples could have been eliminated in the grading process.

Bruises

Since bruises were the major cause of mechanical injury, the number and nature of bruises was analyzed. Every flattened surface on each apple was counted and classified as to size. The result of this analysis is shown in Table II.

Table II. Number and Nature of Bruises

Total number of apples	2223
Number of apples bruised	2180
Per cent of total apples bruised	98.06

Size of bruise	No. Bruises	Per Cent
1/4" or less	8434	43.7
1/4" - 1/2"	6672	34.6
1/2" - 3/4"	2908	15.1
3/4" - 1"	987	5.1
1" or over	287	1.5
Total no. bruises	19288	

While the number of bruises up to 1/2" in diameter constitute seventy-eight per cent of all bruises, this is relatively unimportant as bruises of this size are superficial and are seldom noticed. On the other hand, the remaining twenty-two per cent is of great importance as these bruises not only affect the appearance of the apples but are usually soft, often result in rot, and cause a certain amount of waste. Elimination of these larger bruises which probably were due to careless handling, would do much to improve the market quality of McIntosh apples.

Stem Punctures, Cuts and Cracks

In addition to bruises, sixteen per cent of all apples had stem punctures, twenty-three per cent had cuts and nineteen per cent had naturally occurring cracks in the skin.

Breaks in the skin, of whatever nature, not only detract from the appearance of an apple, but provide a ready entrance for rots. Several specimens were observed in which rot had started from one of these sources. More careful handling can reduce the number of stem punctures and cuts but the cause and remedy of naturally occurring cracks is problematical.

Color

Poorly colored apples detract materially from the sales appeal of a display of apples and lower the price of the entire lot when mixed with well colored fruit. The market for McIntosh apples would be strengthened if such poorly colored apples were kept at the farm and made into cider or sold separately.

Firmness

Using a Magness-Taylor pressure tester with a 7/16" plunger, sixty-two per cent of the apples were in the range of 8.0-9.9 pounds. Forty-two per cent were in the range of 9.0-9.9 pounds. In other words, the majority of the apples were too soft to be in prime eating condition. These apples were either held too long at high temperatures in the stores or fruit growers held them too long in storage before putting them on the market. Wherever the fault may lie, the solution is for fruit growers to watch the pressure of apples in storage more closely and sell them while they are above ten pounds and then for the stores to keep them under refrigeration until they are sold. Only ten per cent of the stores visited sold apples from a refrigerated display counter. The usual answer to the question, "Can you afford to keep apples on a refrigerated counter?" was, "Yes, because it keeps my apples in better condition and saves waste."

Temperature

The temperature of eighty-five per cent of the samples as taken from the stores ranged from 50°F. to 69°F. with forty-six per cent in the 60°F. to 69°F. range. Holding apples at these relatively high temperatures will tend to hasten ripening of the fruit as compared with the lower average temperature of 52°F. as recorded for samples taken from refrigerated display counters.

Loss Due to Waste

The average of prices posted for McIntosh apples in the stores was 13.25 cents per pound. The average cost of usable pulp, assuming there was no waste, was 15.8 cents per pound. The cost of usable pulp with waste removed was 16.5 cents per pound. Hence, the consumer paid 0.7 cents per pound for unusable waste due to rot and bruises. While the financial loss due to blemishes should not be ignored, it appears that the

more serious objection to bruises, stem punctures and rotten spots is the effect on eye appeal which results in reduced sales.

Packages and Packing

Approximately eighty per cent of the packages in which apples were delivered to the stores were the Eastern apple box or "crate". Fifteen per cent were delivered in the cell type carton. Only about two per cent were packed in a tray type carton. Seventy-seven per cent of apples in the "crate" were jumble packed. Since studies in other states have shown that more bruising occurs in the "crate" jumble packed than in any other type of package commonly used, a more extensive use of the cell pack or tray pack would materially reduce the number of bruised apples delivered to retail stores.

The number of samples obtained from bulk displays and from prepackage displays was about equal. The most common type of prepackage was a three pound polyethylene bag. In spite of the fact that studies in New York State have shown that more apples per one hundred customers were sold when five pound polyethylene bags were displayed with bulk apples, only one such display was observed in this survey but in this case three pound rather than five pound bags were used. Only one sample in a five pound polyethylene bag was obtained from the one hundred sixty-eight stores visited.

Market Source

An analysis was made with respect to grade, depending upon the source from which the stores obtained the fruit. No measurable difference was found whether the apples were obtained directly from the grower, from a wholesaler or from a warehouse. From all three sources approximately one-third of the apples were culls due chiefly to bruises and stem punctures.

A markedly inferior grade of fruit was found in stores which purchased apples from transient pedlars.

Random Comments

Mention should be made here of the excellent cooperation received from owners, store managers and produce clerks. In every instance all information requested was graciously given and in many instances considerably more than was requested.

A definite impression was obtained that store managers like to handle McIntosh apples because they are a good selling item. In general, they indicated that they could sell more if they could get well colored fruit, free from bruises and other blemishes and more uniformly sized. Hence, the key to increased sales of McIntosh apples is chiefly in the hands of those who grow, grade, and pack the fruit.

---O.C.Roberts

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More interesting and important findings from this study will be discussed by Professor Roberts at the Summer Meeting of the Massachusetts Fruit Growers Association at Fitzgerald's Orchard in Leominster, July 21st.

---ED.

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SOME ORCHARD OBSERVATIONS

By the time you read this, any chemical thinning you planned to do should be done and the results becoming evident. We will not have obtained set records where experimental trials were made until late June or early July, however, so we cannot say how our tests have turned out yet.

It became apparent in the latter part of May that all growers did not have an overset of McIntosh even though most everyone had a "snowball" bloom on this variety. This situation, we feel, supports our contention that chemical thinning of McIntosh should not begin until 10-14 days after petal-fall. The same sort of thing happened in many Delicious blocks. This variety often "thins itself" to a desirable degree without the use of chemicals. However, some of you may see more apples now and they may seem closer together than they did two weeks ago. Can you still do some chemical thinning of McIntosh? We have thinned McIntosh satisfactorily as late as 4 weeks after calyx, so if you are still within that period or still ahead of the final drop you might help this year's fruit size and next year's bloom by applying a thinning material. If the June drop is well under way or complete, you cannot expect to accomplish anything with chemical thinners, however.

Apparently the amide form of naphthaleneacetic acid is capable of causing foliage injury occasionally. Early McIntosh seems to be susceptible sometimes. In one of our tests on this variety, this year, 12 ounces of the commercial material per 100 gallons of water applied diluted with a hydraulic sprayer in bloom, or at calyx, time caused considerable leaf curling and shoot growth inhibition. The same variety in an adjacent block sprayed with 8 ounces of Amide per 100 gallons with a speed sprayer at petal-fall showed no injury. To our knowledge Early McIntosh is the only variety that this material has injured in this state. At least two growers have noticed it, also, on this variety. It looks like we'll have to suggest lower concentrations of Amide for Early McIntosh in the future.

You may be interested to know that controlled atmosphere storage capacity in this state is on the increase. At the present time there are enough rooms under construction to add about 40,000 bushels to our controlled atmosphere capacity. We expect there will be a total capacity in Massachusetts of 75,000-80,000 bushels this fall.

---F.W.Southwick

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ECHOES FROM THE STRAWBERRY CONFERENCE

at Beltsville, Maryland

Research in strawberry growing is being carried on in so many different parts of the United States, Canada and in foreign countries, that it is highly desirable for the workers in this field to get together occasionally to talk over their problems and swap ideas. In order to provide an opportunity for a "get-together" to discuss the latest developments in strawberry research, and to show what is going on at the U.S.D.A. Horticultural Research Station at Beltsville, Maryland, the small fruit staff at Beltsville organized a two-day conference on May 26th and 27th. Although the conference was designed to meet the needs of research workers, it was not limited to them. Nearly 150 people attended the conference. Of these, a considerable number were nurserymen or their representatives and strawberry growers. These people came from many parts of the U.S. - California, Oregon, Vermont, New Hampshire and Florida, among others - and from Canada and even one researcher from the Netherlands.

The program included talks, demonstrations and field trips. Although many topics were discussed, most attention was given to breeding, virus and the nematode problem.

The use of virus-free plants has increased very materially this year as more virus-free plants were made available. The progressive nurseries are making every effort to increase the supply and keep them virus-free. Two methods are being used to keep the "foundation stock" or "mother plant beds" free of virus. In some states, as is being done in Massachusetts, the plant growers are building screenhouses to protect the foundation stock plants from the aphids which carry the virus from plant to plant. In others, the foundation stock is grown in isolated areas where there are neither cultivated nor wild strawberries for several miles, as is being done in California and Tennessee.

One of the serious problems being faced by every state where strawberries are grown is how to be sure that the grower gets virus-free plants when he orders them. This involves a number of technical, inspection, control and financial problems. These are being attacked in several ways by different states. Tennessee has decided to follow a "get tough" policy. A rather detailed set of rules and regulations has been established and will be rigidly enforced until relaxation seems justified. The cost of "indexing" (testing for virus), inspection and certification is borne by the State. California, which also has a stringent set of rules and regulations, charges the plant grower for these services. In both states the plant grower is allowed to charge a premium of \$4.00 per thousand for the virus-free plants.

Other states are approaching the problem the other way around. That is, they are starting out with a few mild regulations which will be tightened up as it appears necessary. Other states, including Massachusetts, have set up no regulations as yet.

The nematode problem received a great deal of attention because it is one of the newest fields of strawberry research and also because Dr. Caroline Klinkenberg of the Netherlands was present and discussed the results of her work. She stated that the nematode problem is the most serious strawberry problem in the Netherlands and that work on it was started during the last war. It has still not been proved that nematodes are the cause of the root condition called black-root rot, or simply black root. However, it has been shown quite conclusively that where black root is a problem, plant growth has been greatly improved and yields increased by soil fumigation with nematocides. Dr. Braun, of the Geneva New York Experiment Station, discussed his work on this same problem and agreed with Dr. Klinkenberg's conclusions.

During the discussion it was emphasized that the soil must be in the right condition for fumigation, that is, in condition to make a good seed bed, the right amount of soil fumigant must be used, it must be put down deep enough, at least six inches, the soil must be sufficiently warm, 50°F. for the commonly used fumigants, and the fumigant sealed in by a drag, smoothing harrow or cultipacker. Therefore, for strawberries, fumigation in the fall before the plants are set is a practical necessity.

Strawberry breeding is being carried on in twenty-one colleges and research stations. The objectives vary with the needs of a particular region. One of the objectives of the breeding work at Beltsville is the production of varieties resistant to all three strains of the red stele disease. This phase of the breeding work is being carried on in cooperation with the University of Maryland. The variety Stelemaster, which was named and introduced last winter, is one of the products of this project. It is recognized by the men who named and introduced it that Stelemaster is only a stop-gap variety to be grown where it is impossible to grow other varieties because of red stele. Varieties which are superior to Stelemaster and have the same multiple resistance to red stele are in prospect for the very near future.

There is still no control for red stele other than resistant varieties. Some soil fumigants look promising but too little experimental evidence is available to draw any conclusions.

---John S. Bailey

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-----BRUISES COST MONEY-----

Would you knowingly pass by a twenty dollar bill lying on the sidewalk and not pick it up?

Possibly, you are passing up many twenty dollar bills by careless handling of your apples.

As reported in "Apple Research Digest" the Washington State Apple Commission estimates that over the past eight years, because of better handling methods, Washington State apple growers have saved \$2,000,000 annually.

In 1946-47 the Apple Commission made a survey of Delicious apples on retail display and found 31.8 per cent of them severely bruised. After bringing this situation to the attention of the growers by means of films, posters and similar devices, the number of severe bruises was reduced to 11.0 per cent as determined by another survey made in 1954-55.

The recent survey of McIntosh apples on retail display in Massachusetts showed 23 per cent as being severely bruised. This would indicate that Massachusetts growers might save thousands of dollars at least by adopting measures which would reduce bruising to a minimum.

---O.C.Roberts

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POMOLOGICAL RESEARCH

5. Black-Root Rot
of Strawberries

One of the newest projects in the list of research projects of the Pomology Department is that concerned with the cause and control of black-root rot in strawberries. This is being carried on under an informal cooperative agreement with the U.S.D.A. We are working on control measures; the U.S.D.A. man on causal agents and their nature.

The black-root rot disease can be found in all parts of Massachusetts. It is more serious in some sections than in others. It is extremely serious in the Southeastern corner of the state. A state-wide survey carried out in the fall of 1953 (see FRUIT NOTES for November 24, 1953) showed that nematodes are generally present in plants suffering from black-root rot, and that usually the plants showing the worst black-root have the highest population of nematodes in their roots.

The presence of nematodes in the roots of black-root rot infected plants

does not prove that they are the causal organism. Proof of the cause is still lacking as discussed elsewhere in this issue of FRUIT NOTES. Nevertheless, where plants are to be grown on soil known to be infected with black-root rot, the increase in plant vigor following soil fumigation is very marked.

Several soil fumigants such as D-D, ethylene dibromide (EDB), methyl bromide (MC), or chloropicrin are all good nematocides. However, only D-D and EDB are economical for large scale use in strawberry fields. Where these are being used, the rates of application recommended are based on experience with other crops and are not necessarily the right amounts for best results in treating strawberry fields. Therefore, an experiment has been started to test D-D and EDB at three different concentrations and in split applications. Where a split application is used, half the required amount of fumigant is put in the soil, two weeks later the soil is turned over by plowing, or otherwise harrowed smooth and retreated with the second half of the fumigant.

EDB and D-D are standard soil fumigants which have been in use for a considerable number of years. Since these are toxic to plants, a period of at least two weeks must elapse before plants are set. Several new fumigants are in prospect. One of these is now under test. It is of such a nature that strawberry plants apparently will tolerate considerable quantities of it. This would permit its use after the plants are set if this seems desirable.

To insure the best results from soil fumigation, plants whose roots have been freed of nematodes should be used for setting in fumigated fields. Roots can be kept free of nematodes by rooting runner plants in fumigated or sterilized soil. This is slow, laborious and costly. The U.S.D.A. has developed a hot water treatment which is much faster and cheaper. However, there are certain aspects of this treatment which need further study before it can be unqualifiedly recommended.

---John S. Bailey

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ARE EASTERN APPLE GROWERS TAKING THE LEAD? * * * * *

(Excerpts from an address by C.P. Harley U.S.D.A.
before the Washington State Horticultural Association-ED.)

In the past decade we have witnessed a veritable revolution in many industries and the apple industry is no exception. In this short space of time the apple grower moved from a feeling of almost complete frustration to one of more moderate security in the production of his fruit. Just 10 years ago many capable and progressive growers in some eastern areas were firmly resolved to abandon growing of apples because the codling moth had literally taken over. One year's experience with DDT relegated this pest almost to the category of insignificance and now with the development of many other new pesticides the problems attending fruit growing have been greatly eased.

Many other startling advances have taken place and have combined to bring about important transitions in production methods.

Changes in Acreage Holdings - The eastern apple grower today is alert to all these new discoveries, for the general trend is toward greater specialization with larger acreages under one management. Small holdings are rapidly disappearing. Many trees of poor varieties have gone out and very few have been replanted. Also, practically all the new commercial planting is being done by experienced growers. Thus, for the years immediately ahead it appears evident that apple production in the east will

come from a rather stable acreage.

Outlet for Old Varieties - About 40 per cent of the eastern apple crop is now marketed through processing channels. Canned sauce constitutes the major processed output at present and, for every bushel of McIntosh, Delicious or other dessert types, a bushel of York Imperial, Rhode Island Greening, Baldwin, Stayman Winesap or Grimes Golden is required for the proper blend for high quality sauce.

Improved Methods - Production practices in many eastern orchards have had a face lifting in recent years. With larger acreages the trend is definitely toward mechanized methods both in the orchard and in the packing house. Pallet handling of the fruit is becoming common practice. Automatic spray equipment of one type or another is in greater use. Better pruning is achieved through the use of pneumatic equipment and pruning platforms. With the introduction of new pesticides, insect and disease control has been tremendously improved.

Along with these changes the eastern grower is changing his perspective. His sights are now set on growing high-quality fruit. He has become "finish" conscious. Eastern apples were characterized in the past as having rough finish with much russetting. This was due in part to the necessity of using sulfur sprays for disease control, but cold weather in early spring was a contributing factor. Adverse climatic conditions will continue to be a threat to fruit finish; however, much study is being made to find combinations of the newer organic pesticides that will minimize spray injury to the fruit surface. Some excellent progress has been made in this direction. Should these efforts to improve fruit finish show any degree of success, competition of dessert apples on the fresh-fruit market is bound to increase.

Irrigation - Because of the possibilities of improving quality, and in view of the past 3 years of rather serious drought in many areas, growers are giving much thought to irrigation and quite a few orchards are now equipped to irrigate. With the newer equipment now available, it is quite certain that many more growers will adopt the practice if sufficient water is available.

The importance of fruit size also brings up the subject of fruit thinning. The eastern grower is more and more getting to appreciate the importance of this practice, but high labor costs of hand thinning of large acreages are very discouraging. Despite the fact that results have been rather variable, many growers are using chemical spray thinners.

Cultural Practices - The system of culture in eastern orchards is almost entirely one of permanent sod. This sod cover of volunteer grasses and weeds effectively reduces run-off of rainwater and subsequent soil erosion. It also affords protection from soil compaction by heavy spray equipment and other orchard traffic. In the New England states and in many other sections, mulching of apple trees is a standard practice and most of the highest producing trees are found in orchards where this cultural system is followed.

The per-acre production in eastern orchards is considerably less than that of central and northcentral Washington. The average commercial yields are about 250 bushels per acre. Some more favorably situated and better cared-for holdings may produce 500 bushels, while a few exceptional orchards have reached 800. There are many reasons for the lower production, but the reluctance of growers to use sufficient nitrogen is partly responsible. It is well recognized that retardation of red color development is correlated with high nitrogen levels. Environmental conditions not conducive to red pigment formation generally prevail in many eastern apple regions. Nitrogen levels necessary for high yield have invariably resulted in serious reduction in color of most varieties in these areas. Such fruit is not only a drug on the

fresh-fruit market but is unwelcome in processing channels as well. A partial solution to the problem is the increased planting of red bud sports. There is experimental evidence that the red sports are not nearly so sensitive to nitrogen effects as the parent varieties.

Permanent Production Problems - Although there has been great progress, as already mentioned, with new pesticides, the eastern grower still has a battle to grow clean fruit. The recommended spray schedules for the 1954 season listed 10 to 12 applications of rather complicated and expensive spray mixtures. The climate of practically all eastern states is generally ideal for the scab organism to develop and constant vigil must be exercised to keep this fungus under control. The problem is especially serious in view of the fact that 3 of the best quality dessert varieties - McIntosh, Delicious and Stayman Winesap - are highly susceptible to the disease.

Chief among other troubles are mice and poor soil drainage. The common meadow mouse is always present but the most serious pest is the pine mouse. Poor drainage is probably the prime factor causing loss of tree vigor and low production in orchards having clayey subsoil.

Taking the Lead? - In summary, it can be said that eastern apple growers are taking the lead, the lead to improve their competitive position. This does not imply that superiority over operational methods, quality of product and package of the western growers has been achieved. It simply means that the eastern growers are in a position to accept the western challenge with greater courage than they could a decade ago. Apple growing in the East and in the Pacific Northwest is vastly different. The eastern grower is just as intelligent as the western grower, but there the similarity ends. Environmental conditions are so different in the two regions that the end product will never be exactly the same. Eastern Delicious, for example, does not evolve into a long-type apple with prominent projecting points so characteristic of the western grown fruits of this variety. Cold spring rains, lower quantity and quality of sunlight and high night temperatures before harvest will continue to work against fine finish and red color development on eastern fruit. Despite these climatic handicaps, the eastern grower is pressing forward with advanced methodology to improve quality production in both fruit and pack. New plantings are with good dessert varieties, mostly red bud sports and these new plantings mean that increased competition on the fresh apple market and these new plantings mean that increased competition on the fresh apple market can confidently be expected.

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***** Why The Grading Law Should Be Enforced *****

The following are a few retailer comments which indicate their views on apple grades:

"The grading law should be enforced. Stop overfacing."

"I prefer western apples because of uniformity and attractiveness. Would like to have local apples graded. Would like to sell more apples."

"If I buy 2 1/2" apples I want 2 1/2" apples, I don't want 3" apples."

"I lose money on poor apples."

"I bought a lot of apples which were overfaced. Paid \$3.50 for them. Wouldn't knowingly buy another box from this grower."

"I bought apples for a price. Not going to be taken for a sucker again; could have paid \$1.00 more for better apples and been ahead of the game."

At present, retailers are at the mercy of the unscrupulous packer. This situation hurts the sale of apples. Enforcement of the grading law would help to protect the retailer as well as the careful grower and packer.

***O.C.Roberts

—SCIENCE—

Food: Not Less, but More

Behind each mouthful we eat, behind the farmer, the food processor, and the supermarket, stands a little-publicized but critically important line of endeavor—agricultural research. Within a generation, the men of this quietly phenomenal science have put a meaty abundance on the American dinner table envied by all the world.

But with miracles come huge problems. From a glance at the current U.S. farm surplus, one might conclude that science and mechanization have lured the farmer into overproduction. The truth is far from this. The embarrassing pile-up of wheat, corn, butter, etc., is destined to vanish soon.

One good drought could do it. In any case, it will soon be eaten away as the population boom adds 2.5 million mouths a year to the national stomach. If these mouths are to be fed, farmers must become much more scientific than even the best of them are today.

In the following special report, based on talks with top authorities in the field, NEWSWEEK SCIENCE Editor Richard K. Winslow tells of the marvels already achieved by agricultural research and of the knotty problems still to be solved:

LAST week a canny Iowa farm manager, an old hand at "selling" research, put his finger on the changed mood that has revolutionized American farming.

"Before the war, the county agent needed several seasons to put across a proven point on soil care or insect control. Most farmers would wait for the fellow down the road to try it first. Today, it's the other way around. A farmer snoops around an experiment station, then rushes back to try some discovery that the scientists haven't half tested."

For the 1955 season, this science-minded farmer has a bumper crop of fresh wonders to keep his eye on.

A Midwest experiment station is about to release a strain of corn with husks so tough a bird can't peck through. It will also fend off its old enemy, the borer.

Since January, American cattlemen have been slipping a female sex hormone, stilbestrol, to 2 million steers to make them bigger quicker on less feed (an operation, scientists say, that will not affect a steak-lover's manhood).

Breeders also are talking seriously of impregnating 200,000 cows with the frozen semen of a single prize bull.

In New York City, a chemist is taking the last kinks out of an edible sugar-based detergent made from cane and beet sugar. Soap and soap powders containing it do not leave rings around the bathtub, do not sting the eyes—and wash spinach thoroughly.

More, More: To some experts—the ones who can see beyond the misleading mountains of today's surpluses—such advances are deceptive. They are not nearly enough to assure that U.S. agriculture will continue to get its job done.

One of these men, Dr. Byron T. Shaw, farm research chief of the U.S. Department of Agriculture, estimates that, if the average American is to continue to have as much meat to eat as he did last year, all acreage that is currently idle will have to be back at work by 1960. By 1975, even if all marginal lands are used, there might be a deficit of more than 100 million acres. To meet this, livestock production alone will have to be nearly doubled on the land at hand.

But the output of the hard-pressed hen, for example, has already been pushed from an average 100 eggs a year

to 180. Broilers have 70 per cent more meat on them. For further big increases, the hen and her rations—already nutritional dynamite—will have to undergo some serious redesigning.

Big Push: To improve and broaden agricultural research, the National Farm Chemurgic Council—a group of influential farm, industry, scientific and government leaders—is launching a concerted campaign on many fronts this month. This is the group which has long pioneered in promoting industrial uses for such items as corncoals, soybeans, peanuts, and other farm products. They have made such a dramatic success of this that these products now account for 8 per cent of the \$30 billion total farm sales. However the chances for further expansion along these lines look dim in view of the mounting competition from petroleum derivatives. So the council is currently broadening its scope to embrace all aspects of agricultural study, from the test tube to the consumer's palate. (To emphasize this, it is changing its name to the Council for Agricultural and Chemurgic Research.)

The council's president, Henry T. McKnight, a Virginia cattle raiser, is alarmed by the not-too-surprising fact that industry's investment in research is

Revolution at the Dinner Table

In just 30 years there have been big changes in what Americans eat and the way it is produced on the farm. Some of the most startling shifts:

<i>Appetites increased</i>	1925	1955
Beef per citizen per year	59 lbs.	72 lbs.
Oranges	20 lbs.	58 lbs.
Chicken	14 lbs.	23 lbs.
<i>So did farm efficiency</i>		
A farm worker produced food for	8 people	19 people
Crop yields per acre	100 units	130 units
Farm tractors	246,000	4,600,000
Food production of farm animals	100 units	150 units
<i>But . . .</i>		
Production expenses	100 units	300 units
Average farm size	141.9 acres	215.6 acres
Farm population	31,200,000	21,000,000

five times that of agriculture. "It seems pretty shortsighted," McKnight says. "when you consider that the \$15 million spent to develop hybrid corn now brings in more than \$1 billion a year."

To keep the U.S. diet as rich as now in protein, McKnight figures that the \$300 million spent last year for farm research must be doubled within five years. (Half of the annual bill is paid by the government, Federal and state, and half by food processors and farm suppliers.)

Antibiotics: Whether or not the council achieves its goal in that short a time, farm research will continue to unfold excitingly. The big news story at the moment is what is being done with antibiotics, the wonderfully versatile wonder drugs which alone may prove a considerable antidote for the land shortage. They are performing startling feats in making an animal transform more of what it eats into good lean meat.

Antibiotics were initially used on animals to knock out bacterial infections. Soon, scientists found that, in smaller doses, they also made the animals grow faster. First fed to chickens and pigs, they have been supercharging cattle and sheep to a profit-doubling extent in the last two years. Even mink and beagles are thriving on them. In Terre Haute, Ind., the Pfizer Research and Development Farm, which feeds and weighs experimental cattle like rats, now serves a special antibiotic-and-hormone cocktail that is setting fantastic new records for induced growth.

Antibiotics may have even greater potential for plants. Fresh on the market are streptomycin sprays that knock out costly bacterial blights on fruit trees, tobacco, peppers, tomatoes, and potatoes. After treatment, the plants show big crop gains, leading to speculation

that antibiotics not only control plant diseases but may, as was found with animals, somehow stimulate plant growth.

Experimentally, these potent substances are also controlling fungus attacks, responsible for a major part of the nation's \$5 billion-a-year crop loss from pests. They are being screened as insecticides. Dramatically, they are being studied as a means of altering and improving the very chemical characteristics of plants, including tobacco and cabbage, as they grow to maturity.

A present obstacle to their widespread use for all this is an economic one. Antibiotics are pretty expensive for repeated sprayings of low-price crops.

Closer at hand, probably, is the antibiotic preserving of meat, dairy products, and vegetables. This may soon compete with radiation sterilization of foods, which, apart from some use in preventing potato spoilage, is still some years away. Dr. F.E. Deatheridge, head of the Ohio State biochemistry department, embalms fresh-killed steers simply by pumping an antibiotic through their arteries. The meat then will keep through three hot summer days and acquires, in the process, a delicate aged flavor. Similarly, by pumping brine and smoke flavor into a slaughtered hog, Dr. Deatheridge thinks he can put ham and bacon on the table in three days instead of three weeks.

Future Gaps: Supplementing the antibiotics, hormones, and other surprises on the brink of development, the enterprising farmer of the future will have an old standby to rely on: A choice of some 40,000 agricultural chemicals developed over years of research.

All these will help, but the farmer will still have other problems—pressing problems that demand immediate and thorough investigation if those 2.5 million new mouths a year are to be adequately fed. Some of them:

►Mechanized as farming is, the farmer still spends an estimated 65 per cent of his day shoveling, lifting, and toting. **Needed:** A variety of radical labor-saving devices—everything from fertilizer spread by the same vehicle that delivers it to the farm, to pipelines for milk from the udder to the vat.

►Marketing is often a Stone Age process, capable of depressing many a farm item even when production has been modernized. **Needed:** Studies showing the dairyman how to sell his beverage, for instance, as fast as brewers do, and research to ease the way for more "vertical organization" in marketing.

►Though botanists have catalogued 300,000 plants from all over the world, chemists have intensively analyzed no more than a dozen, notably corn and soybeans, for use by industry. **Needed:** A greatly stepped-up search of all plant life for new foods, pharmaceuticals, and chemical products.

►By 1970 American industry will have



Shell Chemical Corp.

Private labs for tender shoots

doubled its already gargantuan thirst for water. With water already in tight supply over most of the nation, crop irrigation is spreading fast over the eastern half of the country, for it enlarges the yields and helps insure against drought. **Needed:** Common sense, stricter conservation, and, above all, more research—on the development of crops and grasses thriving on less water, and on rounding out theories of the water cycle that can be applied to each locality.

This is perhaps the biggest and most ominous scientific lag of all. Without water, all agricultural research could quickly become so much theory.



Charles F. Rutkin

Heat lamps for sowless shoots

Electrical Storms

This is the season of sudden electrical storms of much intensity which sometimes bring death along with their destructive power. Some good advice comes to us today from Connecticut. O. W. Apicer, president of the Bartlett Tree Expert company, suggests that valuable trees 50, 75 or 150 feet tall on your suburban or country place become lightning targets during the summer. These, he said, can be turned into giant lightning rods which will protect both the trees and the surrounding areas. A loosely-woven copper conductor can be extended from the tree-top down the forks and along the trunks, then grounded deep in the soil beyond the branch spread. A lightning bolt striking such a tree is carried harmlessly into the ground.

During a thunderstorm, he advises, keep away from all tall trees, wire fences, beaches and exposed hilltops. If you're near an isolated tree, lightning may jump from it to your body. Or it may enter your body after striking the ground. Or you may be hurt if a tree explodes under a lightning stroke. Trees along a stream or lake are more apt to be hit than those in dryer soil. Oaks, elms, pines, ashes, poplars and maples — in that order — are struck more frequently than any other trees. Tall trees are choice targets for lightning bolts because they offer the shortest distance between cloud and ground.

A negative electrical charge builds up in a cloud during a storm. An equal positive charge is built up on the ground. The two attack each other. As the negative charge moves with the cloud, the positive charge races along the ground beneath it. The positive charge sweeps up trees and buildings to meet the negative charge coming down from the cloud. That is why forks of lightning may be seen moving up from a tree as well as reaching down from the sky.

All this is good advice. It is well to remember these points when vacationing or out on a picnic when a sudden storm bursts upon your group. Someday it may save a life.

Jail and Church Targets For Bolts of Lightning

Personnel at House of Crops Thus Far Up River Rises Slowly

Northampton, May 10—The most vicious electrical storm in several years ripped through Northampton shortly before noon today, disrupting com-

Lightning Strikes North Adams Home

NORTH ADAMS, Mass., May 8—The first lightning strike of the year was reported here today.

The bolt struck the home of Mr. and Mrs. John Simmons during a near cloudburst, setting fire to a bed. Mrs. Simmons alone in

Fire Loss Runs High From Severe Storm

Lightning, which accompanied a violent wind and rain storm into this vicinity early last Thursday, caused a \$12,000 loss in one area, one resulting in a \$12,000 loss, causing a power disruption for

Lightning Kills Boy Milker, Cow

BROOKFIELD, Vt., April 15—Lightning killed a boy, 18, and the cow he was milking in

SOUTHAMPTON BARN FIRE LOSS TOTALS \$20,000

Edward Baskin warned

Lightning -- FLASH OF DESTRUCTION

Lightning is a major cause of farm fires. It strikes without warning. Losses are usually disastrous, and crippling. If your buildings are high, isolated, located on a hill or high ground, or in an area where electrical storms are severe and frequent, you should consider protection from lightning.

Nearby metallic objects, such as ventilating heads, barn tracks, television aerials, fences and wiring with poor or inadequate grounds, may increase your hazards.

Lightning Kills 19 Drinking Cows

Lightning Photographer in Interests of Science

With the hope of making new inroads in the study of lightning, against man's most elusive natural foe, scientists of General Electric Company conducted their eighth summer of lightning research high atop New York's Empire State building this past season. Complete photographic records and electrical measurements were obtained on all lightning strokes striking the National Broadcasting Company's antenna

Lightning Strikes, 11 Flee Home

TV Lead-in Wires, Electricity Fuses Victims Of Bolt

WASHTON, D. C., May 10—A bolt of lightning in the State of Maryland, after a storm of rain, killed 11 people and blew out the fuse in the home of Mr. and Mrs. Almond Bouselle of 12 Briggs St., and did no other damage.

The Bouselle family, who were swimming at the time, and were called back home by Mr. Bouselle's aunt, who lives next door. In the duplex house, a high-voltage electric service was disrupted.

Lightning Hits Golfing Pair

Two Cows Killed In Norwich Storm

NORWICH — Two valuable cows were killed and \$5,000 damage done to a dwelling in a sudden thunderstorm which swept Norwich shortly after 10 a. m. Thursday.

The home of Morris Morgenstein in Norwich was struck by a bolt of lightning, which apparently struck a television guy wire and raced down into the house. The fire started in the attic of the

FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

JULY - AUGUST, 1955

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Pomological Research
Sweet Cherry Varieties
Virus-Free Strawberries

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Doing small fruit research on strawberries, blueberries and beach plums. Mr. Bailey also handles considerable of the small fruits extension program.
- French, Arthur P. - Head of Department
Does some teaching in Pomology and in Plant Breeding, active in small fruit variety testing, currently editor of FRUIT NOTES.
- Lord, William J. - Extension Fruit Specialist
Connected chiefly with fruit growers' problems, other than pest control, and is somewhat involved in research.
- Roberts, Oliver C. - Associate Professor
Teacher of pest control, fruit marketing and other departmental courses. Currently also doing research on fruit marketing.
- Southwick, Franklin W. - Professor, Research
Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also teaches in certain advanced courses.
- Weeks, Walter D. - Assistant Professor, Research
Active on research in nutrition, root stocks, variety and strain tests and winter hardiness. Also teaches certain advanced courses.

Contributors to This Issue from Supporting Fields

- C. O. Cartwright - County Agricultural Agent in
Essex County
- F. E. Cole - Extension Specialist in Fruit and
Vegetable Marketing
- Robert A. Fitzpatrick - Assistant Research Professor
of Agricultural Economics

FRUIT NOTES

July-August 1955

* * * * * EXTENSION FRUIT SPECIALIST * * * * *

It is indeed a pleasure to report that our six months search for the right man to fill the position of Extension Fruit Specialist has resulted in the selection of Dr. William J. Lord for this job.

Dr. Lord recently completed his graduate study at the Pennsylvania State University where he majored in Horticulture (Pomology). His undergraduate training and Master's degree were earned at the University of New Hampshire.

He was brought up on a New Hampshire farm and managed a small apple orchard for five years as a part of his duties while a teacher of Vocational Agriculture in that state and has also had considerable experience with small fruits. During World War II, he was on active duty with the U.S. Army in Europe and then taught at the U. S. Army School in Friesing, Germany before returning to civilian life.

As Extension Fruit Specialist, Dr. Lord will concern himself chiefly with the problems of our fruit industry, other than pest control, including certain phases of the research program. Admittedly, it will take him some time to get acquainted with our Massachusetts fruit industry and its problems, but we are confident that he will develop rapidly into a valuable and important member of our Pomological team serving you fruit growers.

---A.P.French

#

Massachusetts Apple Crop Estimate

One item which always attracts attention at the summer meeting of the Massachusetts Fruit Growers is Walter Piper's crop estimate. This sample estimate is obtained by asking those growers present to report their last year's crop harvested and their estimate of their current year's crop.

The results for this year were as follows:

	<u>1954 Crop</u>	<u>1955 Estimate</u>
McIntosh	201,900 bu.	394,300 bu.
Baldwin	72,200 bu.	55,500 bu.
Delicious	23,590 bu.	49,475 bu.
Cortland	32,290 bu.	47,575 bu.
Other Varieties	31,800 bu.	53,000 bu.
Total	<u>361,780 bu.</u>	<u>599,850 bu.</u>

---A.P.French

#

34th ANNUAL FIELD DAY

University of Massachusetts Field Station at Waltham

The 34th Annual Field Day at the University of Massachusetts Field Station at Waltham will be held on Saturday, August 6. Scheduling the Field Day for a Saturday is an innovation inaugurated for the convenience of the hundreds of people who are not able to visit the Field Station on weekdays.

Some of the special features this year will include:

- (a) Exhibits demonstrating the scope of the work at the Waltham Field Station. These include vegetable breeding, flower production, propagation, plant disease control and insect control.
- (b) The Annual Flower Gardens, including the All-American Selections, which will be at their height on this day.
- (c) The Perennial Gardens are a unique collection of plant material which has been popular among gardeners over the years.
- (d) The Demonstration Home Vegetable Garden, showing a trial of all-purpose pest control materials as dusts and sprays.
- (e) Variety Trials of several kinds of vegetables in which old and new varieties are compared for eastern Massachusetts conditions.

The entire experimental work of the Field Station will also be on display for the public and labeled for inspection. This will include:

- (a) The apple orchard where new pesticides are being evaluated.
- (b) An asparagus field from which a new variety of asparagus is soon to be released.
- (c) A tomato field where improvements are being made in tomato varieties for growing on trellises.
- (d) A squash field where selections are being made for better Butternut Squash.
- (e) A carnation field where diseases of carnations are being studied.
- (f) Greenhouses where research is being conducted on propagation of shrubs and flowers, and on propagation of better flowers and vegetables.

In addition, commercial exhibitors will show the latest in small machinery, gadgets and materials of interest to both professional and amateur gardeners.

---ED.

#####

INCREASING STRAWBERRY YIELDS BY SOIL FUMIGATION

Did your strawberry bed show evidence of black-root? Did plants begin to dry up and die when hot, dry weather started? Did you dig up some of these sick plants and find most of the roots black and dead? If so, then perhaps you need to try soil fumigation. Evidence is increasing that where black-root rot is a problem, soil fumigation results in more vigorous plants and in increased yields.

If you decide to try soil fumigation, arrangements to do the job should be made soon. There are several reasons for this. Fall fumigation is necessary. The soil must be properly prepared. Arrangements must be made with a commercial fumigator or equipment must be ordered and put in shape and a fumigant obtained. So, don't put off preparations too long.

The kind of equipment used will depend on the size of field to be fumigated and the growers' inclination as to what and how much they want to do themselves. For the commercial size planting, two general methods are available. The easiest and surest, although not the least expensive, is to hire a commercial fumigator. He has the know-how, equipment and materials to do a thoroughly satisfactory job. The cost will vary according to the area fumigated and the kind and amount of fumigant used.

On the other hand, a mechanically inclined grower can purchase a kit to rig up his own fumigator. There are one and two outlet, gravity feed kits which can be attached to a one or two bottom plow. The fumigant is dripped into the furrow ahead of the plow. Or a 2,4,6, or 8 outlet pressure kit may be obtained for attaching to a cultivator. The pressure is supplied by a small gear pump hitched to the power take-off of the tractor. An outlet tube is fastened behind each shank of the cultivator with the opening near the bottom of the shank. The shanks are spaced 10 inches apart. Since the amount of fumigant applied is extremely important, directions are supplied with each kit explaining how to adjust it to apply the desired amount. A drag is needed behind the fumigator to seal the gas in the soil.

For a small area a hand injector can be used. This is poked into the soil every 10-12 inches and delivers a small amount of fumigant. An injector of this type is fairly rapid, easy to adjust and handle but is rather expensive. A cheaper, but more laborious method, is to make trenches 6-8 inches deep every 10-12 inches across the field, pour in the fumigant and then cover it immediately. The pouring can be done easily by using a quart, metal-topped fruit jar with two holes punched in the top. The holes are made with an 8 penny nail, one for pouring and one for a vent.

Regardless of the method of application, the soil needs to be well prepared in advance. Thorough plowing and harrowing are necessary to break up all clods. Any large pieces of organic refuse, such as tough sods or corn stalks, must have time to thoroughly decompose since the fumigant will not penetrate them otherwise. In other words, the soil should be well pulverized and moist as if prepared for a good seed bed. Also, it must not be too cold. Effective fumigation can be done between 50° and 85°F.

Fall fumigation avoids late spring planting. If the spring is cold, it may take considerable time for the soil to reach 50°F. A two weeks waiting period is needed after treatment to allow all the fumigant to leave the soil before planting. The last half of September and the month of October are good times to fumigate in most sections of the State.

There are several very effective soil fumigants. However, when one considers effectiveness, cost and ease of handling, only two are practical for fumigating strawberry fields. These are D-D at 20 gallons per acre and ethylene dibromide, or EDB at 9 gallons per acre of a material containing 83 percent EDB by weight. Effective treatment requires that these materials be placed 8 inches deep in the soil at intervals of 10 inches. If fumigating is done ahead of a rain, the water will help to keep the fumigant in the soil and make it more effective.

So, if you have black-root rot trouble and want to try soil fumigation, prepare the soil thoroughly, see that it is at the right temperature, use the right amount of a good soil fumigant, get it down eight inches in the soil and drag the field to hold the gas in the soil. Do this in the fall and avoid delayed planting in the spring.

---John S. Bailey

Country Point Pricing of Apples - - - - -

A method of country point price reporting was developed by the Department of Agricultural Economics, and tested during the '52 and '53 apple marketing seasons. The study dealt with McIntosh sold at wholesale.

A group of growers, whose marketing practices were representative of the practices of all local growers, volunteered to report their sales data. All information reported was kept confidential.

Reporting was on a weekly basis. Growers were supplied with blank forms, on which they wrote the sales data. Prices were figured "back to the storage". The growers sent the filled-in forms to the University, where the data were summarized. The forms were then returned to the growers.

The report form listed the following: Date of sale; Number of bushels sold; Price per bushel; Nearest U.S. grade; Size; Condition; Color; Package; Kind of buyer; and market area where sale was made.

In the second season, a weekly summary was sent to the growers. This sheet listed the volume sold to date, and the country point price for various grades, sizes, and packages sold to various outlets in the various markets. It also gave an indication of the relative movement by grades, packages, and sizes.

The total volume reported in the first season was 25,000 bushels with a "shipping point" value of about \$115,000. In the second season, over 70,000 bushels were reported, with a value of about \$200,000.

The growers who took part in the study reported that the information secured was of substantial value to them, as it gave prices received by growers who sold in many different ways, and that it was more realistic than information from whole sale market centers alone.

---Robert A. Fitzpatrick

- - - - -

The practical findings of the research study reported above are as follows:

1. Country point price reporting is possible.
2. "Back to the storage" prices indicate what growers are actually getting from several methods of marketing.
3. Modern methods of marketing emphasize the country storage point as an important pricing point. Storage door prices were shown to be more steady and more realistic than Boston wholesale market prices.
4. A method of reporting by growers has been tried out and suggested for adoption.
5. The accuracy, value and use of the suggested method depends upon growers.

---F.E.Cole

At the summer meeting of the Massachusetts Fruit Growers Association it was voted to request the Massachusetts Department of Agriculture to supplement existing apple market reports with more complete country point pricing.

-- ED.

#

PREHARVEST DROP CONTROL OF APPLES

This year there has been considerable speculation as to just where growth regulating substances or "hormones", used for thinning and preharvest drop, stood following passage of Public Law 518 - the "Miller Bill" which became effective July 22, 1955.

Of the materials being used on apples for these purposes, naphthaleneacetic acid (NAA), naphthaleneacetamide (NA Amide), 2,4,5-trichlorophenoxyacetic acid (2,4,5-TA), and 2,4,5-trichlorophenoxypropionic acid (2,4,5-TP), only NAA has an established tolerance which is 1.0 ppm. Thus we thought that unless tolerances for the others were set before fall, neither 2,4,5-TA nor 2,4,5-TP could be recommended for preharvest drop control.

However, it now appears that these materials are not considered "pesticides" and therefore are not subject to the regulations of the Miller Bill. "The term pesticide refers to a chemical used for preventing, destroying, repelling or mitigating any virus, insect, rodent, fungus, weed or other form of plant or animal life which is recognized as a pest and which is used in the production of a raw agricultural product. These pesticides are economic poisons and include weed killers, insecticides, fungicides, rat killers, etc." From this definition it seems that the preharvest drop and chemical thinning materials are excluded. In other words, we expect to be able to recommend the use of NAA, 2,4,5-TA and 2,4,5-TP as we have during the past few years. We have been told that manufacturers and suppliers will produce and provide these materials as they have in the past. Hence, we expect to have available for distribution through the County Extension Offices, and the University of Massachusetts, Special Circular No. 254, "Preharvest Drop Control of Apples" by mid-August at the latest.

We anticipate that interest in drop materials will be appreciable since most growers have large crops of McIntosh to harvest. We want to remind you that apple trees are inclined to drop fruit rather heavily when carrying a large crop, when the weather is warm at harvest time, when the trees are high in nitrogen or deficient in magnesium or potassium, or when the foliage has been badly damaged by mites or frost. Hence, keep the foliage in good healthy condition and free from serious mite injury. If you suspect that some of your trees may be approaching a magnesium deficient condition a couple of sprays of epsom salts at the rate of 20 pounds per 100 gallons may be a very worthwhile investment. These hormones won't control fruit drop of apples if the foliage is not in a good, healthy condition.

--F.W.Southwick

#

POMOLOGICAL RESEARCH

6. A Study of New Varieties
of Fruits

The study of new varieties has been conducted for a longer period of time than any other work conducted by the Department. In October of 1888, Professor Maynard reported on new and standard varieties of fruit. Some of the varieties of apples which he listed such as Yellow Transparent, Gravenstein, Baldwin and R. I. Greening are still being grown, but it is rare to find the varieties Porter, King, Fameuse, Fallawater, Sutton Beauty and Pewaukee in a commercial orchard today. His peach list did not contain a single variety which we are now growing. The list included Alexander, Mt. Rose, Old Nixon, Stump, Arkansas Traveller, Red Cheek, Morris White, Wheatland, Smock, Early Crawford and Late Crawford. Elberta was then 18 years old but was not included in the list of peaches which Professor Maynard was growing at that time. The strawberry variety list included such names as Daisy, Daniel Boone, Garibaldi, Jessie, Old Iron Clad and Woodhouse, but did not include any of our recent strawberry varieties. I expect this is enough of ancient history but it does show how the variety picture changes over the years and the need for continuing the study of new varieties.

At the present time we attempt to obtain promising new variety introductions of all the principal fruits which appear to be adaptable to Massachusetts. After we have fruited each variety for a sufficient length of time to determine its value for our conditions, we either discard the variety as having no value or recommend it for trial. After a variety has been grown for trial by the station and by growers long enough to fully determine its value as a commercial variety, it is then discarded if found wanting or recommended for commercial or home planting.

The results of our variety studies are used as a basis for our special variety circulars. The circulars list the varieties which are recommended for commercial and home use and varieties for trial. Brief descriptive notes and the harvesting season for each variety are also included in the circulars. These variety circulars may be obtained from the Mailing Room at the University at Amherst or from the Department of Pomology. In the future we hope to have some stories in this publication on varieties we have tested and discarded. We shall give the principal reasons why we think the variety does not have any value for Massachusetts conditions.

---W.D.Weeks

#

SWEET CHERRY VARIETIES

While commercial sweet cherry growing is of relatively minor importance in Massachusetts, several varieties have been tested in the University orchard during the past twenty-five years. Many have been discarded for one or more reasons, as follows:

Dikeman - While it ripens late, it is mediocre in quality, unattractive, and too small to merit further consideration.

Early Honey Heart - As the name implies, it is one of the earliest varieties but is a small, yellow cherry, cracks badly and is generally unattractive.

Elkhorn - This is an old variety which has been discarded because the fruit is small and the tree tends to be unproductive.

Genesee - This variety has been planted repeatedly but invariably has failed to grow.

Nelson - A dark red cherry indistinguishable from Schmidt.

Noir de Guben - A dark red cherry of mediocre quality and size. Inferior to Schmidt which ripens at the same time.

Paul Rose - A light colored cherry with a distinct red suture. A sport of Schmidt but inferior in appearance.

Sodus - A light colored variety of inferior quality with a tendency to crack at the apex.

Yellow Spanish - An old yellow variety which is inferior in size and appearance to Emperor Francis.

Varieties which are still under trial or have been retained to serve as a basis of comparison are as follows:

August Supreme	Lyons
Bing	Milton Black Tartarian
Black Heart	Napoleon
Black Tartarian	Seneca
Early Rivers	Schmidt
Emperor Francis	Schrecken
Geant d'Hedelfingen	Sweet September
Giant	Victor
Gil Peck	Vernon
Lambert	Windsor

York Imperial

—O.C.Roberts

#

Peach and Grape Twilight Meeting

The Massachusetts Fruit Growers Association, with the County Extension Services cooperating, will sponsor a Twilight Meeting on peaches and grapes at S. L. Davenport's, North Grafton, Wednesday, August 31, 1955 at 7:00 P.M.

Here is an excellent opportunity to get the low-down on a couple of good diversified cops. Mr. Davenport is one of the few commercial grape growers in the State and has large variety collections of both fruits.

—A.P.French

#

VIRUS-FREE STRAWBERRIES

Roger H. Lewis of Andover, Essex graduate of '25, is using several ingenious methods for the production of virus-free strawberry plants. Roger built the first and only screen house in Essex County for the production of virus-free stock last spring.

Four varieties, Catskill, Howard 17, Robinson and Sparkle, were grown in 1954. These four varieties plus Fairfax, Midland and Stelemaster are now being propagated in the field.

In order to prevent infection by the strawberry aphid which carries the virus, Roger dusted all strawberry plantings at weekly intervals, using a ton of parathion in 1954.

In order to speed up the digging of plants Roger has adapted a two-row potato digger for loosening the plant beds.

To get ideal growing conditions for plants, Roger uses large quantities of farm manure, cover crops and rotation with vegetables. Irrigation is used as needed throughout the growing season from the nearby Merrimac River. All vegetable and strawberry crops are bedded in 60" beds, this giving ideal soil with no compression from tractor and other tools.



Application of parathion with 3-row duster.



Digging plants with 2-row potato digger.

The screenhouse soil has been fumigated and is now growing stock plants of the following virus-free varieties: Howard 17, Sparkle, Catskill, Robinson, Red Star, Empire, and Armore.

Roger plans to fumigate all soil used in the field production of virus-free strawberry plants this fall to give nematode-free stock. He has built a fumigation chamber for treatment of cyclamen mite. Roger's goal is to have virus-nematode cyclamen-mite free plants for sale as soon as possible.

It appears that when better strawberry plants are grown, Roger Lewis will have them.

—C. O. Cartwright

FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

SEPTEMBER 15, 1955

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United States Department of Agriculture and County Extension Services cooperating.

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FRUIT NOTES

September 1955

***** PREHARVEST DROP CONTROL OF APPLES *****

The materials available for preharvest drop control of apples seem to have stabilized, at least temporarily, following several new introductions during the past few years. Hence, most commercial growers in Massachusetts have had some experience or introduction to all the materials which are to be discussed.

Growers may now choose among the three available materials, naphthaleneacetic acid (NAA), 2,4,5-trichlorophenoxypropionic acid (2,4,5-TP) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-TA). The selection of a given material should be related to the variety, how long it will take to pick a block or orchard following treatment, and whether hastened ripening is desired or not. For example, we believe 2,4,5-TA represents the best of the three materials listed for McIntosh when drop control of more than 2 weeks is desired with a minimum of hastened ripening. However, NAA is still a good material for the grower who can harvest his McIntosh crop in 7 to 12 days.

NAA

1. Apply when drop of many-seeded, blemish-free fruit commences.
2. It may be applied as a spray, dust, or by airplane. Spray applications may be concentrated.
3. When used at single (10 ppm) or double (20 ppm) strength (4 to 8 oz. of most commercial formulations per 100 gallons) it will reduce the rate of drop of McIntosh for 7 to 12 days. If a single strength application is made somewhat longer drop control may be obtained by the use of a repeat application about 7 days after the first treatment.
4. NAA generally causes less direct ripening to fruit than 2,4,5-TP and slightly less than 2,4,5-TA but the higher the concentration of NAA used and the greater the number of applications the greater the ripening effect.
5. It is satisfactory for drop control of McIntosh providing the block can be picked within 7 to 12 days after treatment.
6. For most late varieties 2,4,5-TP is probably a more satisfactory material. (See discussion under 2,4,5-TP.)

2,4,5-TA - For McIntosh Only

1. Apply when drop commences (Same timing as NAA).
2. Use at 20 ppm (read label) as a spray. Dust formulations are not generally available. It can be applied by airplane.
3. 2,4,5-TA will often control drop for 3 to 4 weeks but not quite as effectively as 2,4,5-TP for the first 3 weeks.
4. 2,4,5-TA does not hasten ripening as much as 2,4,5-TP and not much more than NAA. Remember that the longer apples hang the softer they become even if no stop-drop material is used. Don't let the fruit remain unharvested too long if a good apple for long storage is desired.
5. This material is not suggested for varieties other than McIntosh because of lack of experience or failure to control drop (2,4,5-TA was ineffective in controlling drop of Baldwin).
6. 2,4,5-TA is a brush-killer at high concentrations so do not use it at concentrations above those suggested and do not make repeat applications.

2,4,5-TP

1. For best drop control of McIntosh, but with the least ripening effect, apply when drop commences (same timing as NAA).
2. When used at 20 ppm (read the label) it will reduce rate of drop for about 3 weeks after application on McIntosh. Do not use higher concentrations.
3. It can be applied as a spray or from an airplane. Dust may be satisfactory, if available. It may be concentrated safely up to 3X.
4. If a good storage McIntosh apple is desired, pick the fruit within 2 weeks of spraying, even though fruit is not dropping, to keep ripening effect at a minimum. For longer drop control with less chance of hastened ripening, use 2,4,5-TA on McIntosh.
5. For drop control on late varieties such as Baldwin, Rome, and Delicious, delay the application until drop is about to start or before the foliage becomes injured by frost or mites. Drop control may be expected for about 4 weeks after treatment on these late varieties. This may be the best use for 3,4,5-TP since its ripening effect on many late varieties may not be too pronounced.
6. If used to hasten ripening and improve color of early and midseason varieties, apply at least 3 weeks ahead of harvest date. Apples from trees high in nitrogen levels, will be ripened more than fruit from trees at lower nitrogen levels. Do not use 2,4,5-TP for improving color on regular Gravenstein, Duchess and Milton since color is not greatly improved and the fruit may become mushy and worthless. It has been used for this purpose with some success on Early McIntosh and Wealthy. Beware of over-ripeness, splitting, and water-core when used as a ripener. The ripening effect is not uniform over the entire tree. Some fruits will be ripened much more than adjacent fruits.

General Comments

No hormone is effective for drop control if the foliage is in an unhealthy condition as a result of frost or mite injury. Also, trees suffering from magnesium or potassium deficiencies will drop their fruit readily and hormones will not prevent it.

---F.W.Southwick

#

Magnesium Deficiency - Symptoms of magnesium deficiency are appearing in some of our Massachusetts orchards. This deficiency generally is more prevalent in heavy crop years. Look for a yellowing or browning of the leaf tissue between the veins on the older leaves. In severe cases, the older leaves may have dropped off to such an extent that some branches or the whole tree may be almost defoliated by late September. In addition, magnesium deficiency may cause heavy fruit drop.

---ED.

#

HAZARDS OF DISCARDED ICE BOXES AND REFRIGERATORS

Discarded ice boxes and refrigerators make inviting places for games by small children. Heretofore, many of these discarded ice boxes and refrigerators have been small in size. This lessened the probability of a child's crawling into any one of them. However, families are continually purchasing new refrigerators and freezers in increasing numbers. This increased purchase is occasioned by many factors, including the desire for new boxes with freezing compartments. The old refrigerators which are now being discarded are larger in size than those which were discarded years ago. Temporary housing has also stepped up the number of these discarded ice boxes, refrigerators, etc. All this adds up to more and more inviting discarded refrigerators and freezers for children to crawl into today, and with these discarded air-tight cabinets with locks and hinges intact, they provide enticing hiding places.

It is only natural for children to crawl into these hiding places as part of a game. Many, however, are locked in through malicious intent of older boys and girls. Once the child is in this air-tight box, it's not possible for the child to be heard or seen, and the refrigerator becomes a death trap.

Something can be done about this - community action where the community as a whole, makes a conscious effort to dispose of these empty boxes. However, the individual can make these discarded refrigerators harmless by removing the door, removing the latch stop so that the door cannot lock, drill holes in the cabinet and remove the gasket so it won't be air-tight, or destroy the box altogether.

If you have one of these refrigerators that you are going to discard, do some of these things and save the children in the neighborhood from possible accident. Perhaps the community or some local radio station could carry on a program of community education to safeguard the children in the neighborhood from these death traps.

---R.B.Parmenter
Chairman-Safety Committee

#

Wisdom from the Past-----

The preamble of the first yearbook of the National Apple Association (now the International Apple Association) organized in 1895, included as one of its objectives this statement:"In urging the necessity for a uniform standard of barrel and a strict adherence to honest grading in packing, it is endeavoring to promote the welfare of the grower while at the same time protecting the interests of the consumer."

While the statement relative to the barrel has no significance today, it is interesting to note that sixty years ago the harmful effect to the apple industry of dishonest grading and packing was appreciated. This continues to be significant at the present time.

---O.C.Roberts

C I D E R N O T E S

Pasteurization - Many cider makers are contemplating pasteurization of cider for part of their production. Work on this phase of cider making is currently underway at the USDA Eastern Regional Laboratory. While results are incomplete, one of the more promising set-ups is the use of a 30 gallon hot water tank (one end removed) with two side-arm heaters to heat the water. A coil (aluminum preferred) through which the cider flows is immersed in the tank of water. Cider flow is adjusted by a valve or clamp to raise the outlet temperature to about 180°F. After pasteurizing, it is filled into preheated bottles and cooled. For best results, the cider should be filtered before filling to remove sediment.

Clarification - Many of you like a clear cider, but one that is not polished or is brilliant in appearance.

A clear cider can be gotten by allowing a tankful of fresh cider to settle for 24 hours and then siphoning off all but the last few inches in the tank. If possible, have the tank in your cold room to prevent fermentation.

Containers - At the present time, many new homes and apartments are short on storage space, especially refrigerator space. Move with the trend and supply customers with a variety of container sizes. Quart containers may sell while gallon containers of cider will remain on the floor. Perhaps a square gallon container or half-gallon will move whereas round containers won't. Conduct a poll among your customers to help determine their needs. Remember, satisfied customers come back!

---K.M. Hayes

#

A REMINDER*****

Now that apple harvest has started, copies of special circulars no. 245 and 246 would be helpful.

Special circular no. 245 is titled, "Harvesting Suggestions for Orchard Foremen". It covers five things that orchard foremen should show the pickers and nine things that they should tell them.

"Be A Better Apple Picker" is the title of special circular no. 246. This circular stresses seven harvesting practices the apple picker should follow in order to pick apples easier, faster and better.

Copies of these two special circulars may be obtained at your County Extension Office,

---ED.

Harvesting Suggestions for the Owner

Special circulars no. 245 and 246 give harvesting suggestions to the orchard foremen and the apple pickers. What about suggestions for the owner? Here are a few worthwhile harvesting suggestions for the grower.

1. Make contacts for obtaining labor before the harvest season.
2. Inventory all harvesting equipment well in advance of harvest.
3. Take time to show pickers how to pick properly and avoid bruising.
4. Provide good harvesting supervision.
5. Provide picking buckets and ladders of good design.
6. Keep harvesting equipment in good repair.
7. Provide plenty of empty containers and picking equipment conveniently located.
8. Provide adequate toilet facilities.
9. Provide plenty of cool and conveniently located drinking water.
10. Explain carefully the system of paying and keeping track of the number of bushels picked.
11. Take time to analyse the handling methods from tree to storage in order to increase efficiency and storage life of the fruit.

—ED.

#

REDUCE LABOR OF LOADING APPLES ON TRAILERS

A study was conducted in the state of Washington to accumulate information on methods and costs of loading and moving apples from orchard to the storage and the packing plants. Such a study was of value because this operation is a direct cost to the grower and handling methods have a n important bearing on how quickly apples can be moved into cold storage.

One phase of the research involved a time and labor study of three methods of loading boxes on orchard trailers . Since there is great variability in time of driving and preparation to pick up boxes, only the actual operation of loading boxes was considered.

Method A - The most common method (A) of loading trailers uses one worker on the ground to lift boxes from ^{under} the tree, stacking them in rows on the trailer bed. It is frequently necessary for this workman to carry the boxes several steps in this operation. Another worker stands on the trailer bed and picks up the boxes and places them into hauling position. The amount of time required to load the trailer is 3.04 man hours per 1,000 boxes.

Method B - A variation of the common method (A) is for the man on the trailer platform to stack the center rows on the trailer and then move to the ground, where he

helps the other worker to finish loading. This method (B) saved more than one-sixth of the work requirements per 1,000 boxes and reduced the time to load the trailer by approximately one-fourth of an hour per 1,000 boxes.

Method C - Method (C) eliminates the man standing on the trailer platform. This was accomplished by placing hardwood skids across the trailer bed which enable the worker to push the stacks of boxes toward the center of the trailer after building a stack of the desired height on the edge of the trailer platform. Thereby, the whole load can be handled from the ground.

Method (C) saved 39 percent of the loading labor required by the common method (A) and reduced the elapsed time to load a trailer by nearly 40 percent.

Comparison of the Three Methods

The results of the study showed that even with the slight variation of methods (A) and (B), it would pay to instruct the man on the trailer to stack the center row of boxes and then help the other worker to finish the load from the ground. Method (C) reduced costs considerably as a result of man hours saved. In addition, it may allow the use of a smaller crew because one man can do all the loading and hauling of fruit to the storage. In large orchards the saving in total time may reduce the amount of hauling equipment necessary. The difference in the capital cost of equipment for methods (A), (B), and (C) is negligible. The cost of the hardwood strips may be off-set by less wear on the trailer platform.

---W.J.Lord

#

SEEN AND HEARD IN THE FIELD - - - - -

Powdery Mildew - The author had the opportunity to go on the Hampshire County Fruit Tour to Columbia and Dutchess counties in New York. One of the highlights of the program was the visit to Albert Cole's farm in Red Hook, where we saw some of Dr. Palmiter's fungicide test blocks for powdery mildew control on Jonathan apples.

Apple powdery mildew always has been a serious disease of apples west of the Rocky Mountains but has not been so prevalent in the East. Dr. Palmiter stated that it has become a serious problem in some of the New York orchards, particularly in the western part of the state.

The mild winters and the use of organic fungicides were considered two of the main reasons for the increase of powdery mildew in the New York orchards. The organic fungicides now being used do not control the disease and the mild winters have been favorable for the over-wintering of the fungus threads. It was evident in the test blocks that sulfur controlled the mildew while the organic fungicides were ineffective.

The powdery mildew was found on the under side of the leaves on the terminal growth. The affected leaves were crinkled and curled, and the under side of the leaf covered with grayish or white felt-like patches. In some instances the fungus patches covered the entire under surface of the leaf and the affected foliage was hard and brittle. In addition to the grayish or whitish patches, small black patches of winter spores on the affected leaf petiole also were noted. The fungus threads of the mildew

penetrate and over-winter in the terminal buds and in the tissue of the youngertwigs. In the spring, these are the source of primary infection.

"The chief loss from the fungus results from its attack on the foliage which, in severe cases, so devitalizes the tree that it fails to produce fruit buds and causes a crop failure in the succeeding season."

Although powdery mildew has been reported in New York and Connecticut, at present it has not been found in Massachusetts.

- - - - -

Pint or Quart Baskets for Blueberries? - "Blueberries packaged in quart baskets will sell better than those in pints. Baskets of blueberries without cellophane on them sell better than those that are covered." These statements were made by a blueberry grower at a small fruits twilight meeting held on his farm. This grower thought the reason for the preference of blueberries not covered with cellophane was because customers on many occasions have been disappointed with farm products packaged in cellophane or polyethylene.

On the other hand, another grower uses pint berry boxes exclusively. The blueberries are sized into three grades with the best grade sold in plastic boxes with a plastic cover. However, all three grades of fruit are sold in baskets either covered with cellophane or a plastic top. The grower commented that with plastic berry boxes, which are latticed, the customer can see berries other than those on top. With these boxes, the customer can be sure of the fruit quality throughout the package.

A third grower puts blueberries in quart baskets for roadside stand sales while those going to stores are put in pints. He felt that in stores the public is accustomed to buying pint boxes of blueberries.

The facts stated above show that no one container for blueberries can be considered best from the standpoint of size or type. Just because a certain type of package is preferred in one locality does not necessarily mean it is to be preferred in others. The grower who operates a roadside stand has an opportunity to determine what is best for his particular situation. In order to sell fruit not only must it be of high quality, but it must be packaged to meet the desires of the purchasing public.

---W.J.Lord

#

NOTES ON VARIETIES - BRAMBLES

Among the bramble varieties that have been tested at the University, the following deserve or provoke comment at this time:

Bailey blackberry. Again this year, we have been very favorably impressed with the large size, sweet flavor and good production of this new variety. It is so far ahead of Hedrick, another new one from New York, that there is no comparison.

Ebony King blackberry. This new variety which was obtained from a Michigan small fruits nursery has turned out to be a mixture of two different things. A part of the plants are very similar, if not identical with, Eldorado while the rest bear a very small, imperfect fruit which is absolutely worthless.

September red raspberry. This variety was outstanding for its early summer crop this year - as early as Sunrise with larger, better berries and fully as good production. Ofcourse, September is also the best fall cropper for this area.

Taylor red raspberry. Three successive plantings of Taylor have been killed by virus disease within about five years after planting in our trials. However, in isolated spots there are some fine plantings of this variety in the hills of Franklin and Worcester counties. Experience here and in other parts of the state indicates that only under conditions of good isolation and fairly high altitude, is this variety likely to be worth planting.

Tweed red raspberry. This is an early variety from Canada. Earliness is its only virtue; its fruit is distinctly inferior to September and Gatineau in size, flavor and attractiveness.

Antietam red raspberry. This is a recent introduction from Maryland which ripens in early mid-season, has fairly good color and size and is rather firm. However, the berries are rather irregular and are very inferior in flavor. It has no place in Massachusetts where better varieties can be grown.

---A.P.French

#

-----Will You Lose Some Trees To Mice This Year?-----

The amount of serious damage to fruit trees by orchard mice this coming winter is going to depend on the action you take during the next two months. It has been demonstrated time and time again that an orchard mouse control program pays off. Occasionally a fruit grower will neglect to eliminate his mouse population in one season and will suffer no damages. He may then feel that maybe these mice are not as dangerous as they are made out to be. As a result he may drop his baiting program the following year also. So what happens? Unless he is endowed with a greater-than-average supply of good fortune, more than you and I, he is hit and hit hard by the little rodents.

This same logic can be applied to a slipshod, inefficient, baiting program. If he gets away with it once, he is tempted to do it again and again. Until, during one fine February thaw, he is confronted with rows of glistening, barkless tree trunks. Does this happen in your orchard operation?

Our recommendations for orchard mouse control this year are not radically different than last year. Hand-baiting is still the best control method for the smaller orchards. This means the placing of poisoned bait directly in natural mouse runways only. If properly done, hand-baiting is very effective and better results cannot be achieved by any other method known to this date.

For larger orchards, the orchard mouse trail builder machine is recommended. The big advantages of this mechanized operation are in time and labor savings. Results should approximate that of hand-baiting in the same area. Another advantage in some instances is that less reliable or experienced help may be employed with the

trail builder than with the hand-baiting program. Very conscientious employees are necessary for hand-baiting as it is a tedious, and sometimes discouraging, job when the mouse population in an orchard is small but still present.

Apparently, there will be plenty of drop apples on the ground this year. If this condition occurs in your orchard, our advice is that both Zinc-phosphide-treated oats and Zinc Phosphide-treated apple cubes be used as a bait, and it should be heeded. Field trials have indicated that even under normal conditions, the use of this combination bait gives better pine mouse control. But when the orchard floor is littered with apples, the apple-and-oat partnership has a decided advantage.

Mowing, as an indirect approach to mouse control, is frequently over-looked. The goal here is a completely clean tree base, even if we cannot quite attain this ideal with mechanical equipment. It is surprising how much more grass can be dropped by the cutter bar if you abandon the routine of mowing up and down the row in one direction only. George Marshall of Fitchburg, Massachusetts, can testify to this. After all, in a symmetrical orchard there are sixteen different directions to mow and still be on a row of trees, provided of course, that the orchard floor is smooth enough to allow traversing on other than the spray rig path.

Special emphasis should be placed on late season mowing this year. Dry weather persisted well into August but then the tropical cloudbursts came. As in the tropics, the grass cover has sprouted into a luxuriant jungle - an ideal home for the infamous orchard mice. Removal of this cover before baiting time will be of great value.

---W.R.Jones

#

Mouse Populations

According to an article by G. C. Oderkirk, the mouse population varies markedly from year to year. The reason for this fluctuation has not been definitely established, although adverse weather conditions and disease are considered important factors. Meadow mice are prolific and under favorable conditions, have from 5-10 litters of young a year, with anywhere from 1-11 per litter. The number and size of litters are usually greater in the so-called "mouse years". During these years, the mouse population increases rapidly and if conditions are favorable, they increase over a period of 4-5 years and then become scarce. These population peaks are reached about every four or five years.

"It would be nice if we could predict the 'mouse years' but they are somewhat localized. However, knowing that these fluctuations occur makes it important for the fruit grower to keep an eye on the ground to note the runways and other indications of mouse abundance."

---ED.

from WISCONSIN HORTICULTURE

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Publication approved by George S. Cronin, State Purchasing Agent

CONTROL OF CHICKWEED IN STRAWBERRIES

Chickweed control is the number one problem in many strawberry fields in the early fall. When the seedlings appear in late September, or early October, they look pretty small and with cold weather coming, one can easily be misled into thinking that they won't amount to much, that is, unless one has had previous experience with chickweed. It can make a tremendous growth in four to six weeks and may completely cover the strawberry plants. It often lives over winter and makes more growth in the early spring. Not infrequently beds become so heavily infested that picking is no longer profitable and the bed must be plowed under.

Fall is the best time to control chickweed. The smaller the seedlings when a herbicide is applied, the better the control will be. For early fall application, that is before the strawberry plants are dormant, Chloro IPC, or simply CIPC, is recommended. It can be applied as early as the first week in October or at any time thereafter until the ground freezes. Used at the rate of 2 lbs. per acre, it is effective. Since this material is usually formulated so that it contains 4 lbs. of CIPC per gallon, 1/2 gallon is required for one acre. One liquid ounce would be enough for 680 sq. ft. or one teaspoonful for 200 sq. ft. Since CIPC works through the roots, the amount of water used is not so important. Enough should be used to give good, even coverage. The advantage of spraying with CIPC can be seen in the photograph. The two rows on the left were sprayed at 2 lbs. per acre in October 1954. The two rows on the right are unsprayed. If the straw-



berry bed was not treated in the fall, it can be sprayed with CIPC in the early spring. Some control can be obtained but it will not be so good as that following fall spraying because CIPC breaks down faster in the soil as the soil temperature increases.

Certain of the di-nitro compounds which are made especially for chickweed control. Di-nitro-ortho-secondary-butyl-phenol, or simply DNOSBP, and its amine and ammonium salts are readily available and effective.

Chickweed Control - Picture Taken in Spring, 1955

the leaves of the strawberry plants as well as the tops of the weeds. For this reason they should be used on strawberries only in the late fall after the plants become fully dormant. When the DN is correctly used, the chickweed can be killed

Since these DN compounds act by "burning" foliage, they will kill

with no damage to the strawberries. If it is applied on a warm, sunny day, the "burning" action will be increased and better control will result. Thorough wetting of the weed tops is essential for a good kill. The smaller the weeds are, the better the kill.

The effectiveness of DNOSBP can be increased by the addition of oil. This does not apply to the amine or ammonium salts, which will not mix with oil. One lb. of actual DNOSBP with 10 gallons of fuel oil and 90 gallons of water per acre when evenly and thoroughly applied will give good control of chickweed. To keep the oil in suspension, thorough mechanical agitation is necessary. Without it, the oil may separate and injure the strawberries.

Since the various forms of DN weed killers are made up with different amounts, of actual DN, the directions on the label should be read carefully. For application to small areas with equipment without mechanical agitation it would be safest to omit the oil. Where one lb. of actual DN per acre is called for and the commercial material contains one lb. of actual DN per gallon, one liquid ounce in one gallon of water will cover 340 sq. ft. or 85 ft. of row, 4 ft. wide. If the commercial material contains 3 lbs. per gallon, use $1/3$ ounce, or 2 teaspoonsfull. At 5 lbs. per gallon, use a little over a teaspoonfull.

*** John S. Bailey

FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

OCTOBER 15, 1955

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FRUIT NOTES

October 1955

CONTROL OF RODENTS IN APPLE COLD STORAGES

Apple cold storage rooms on the farm are becoming a common sight. One of the problems with which a storage operator may have to contend is a rodent infestation in the storage after the room is partially or completely filled. Most storages are inherently roden-proof. Before starting operations each season access points, such as the openings around pipes, and places that offer rodent harborage, such as breaks in the insulation, should be checked and repaired if necessary. The areas around doors and loading ports should be free of debris in which rats and house mice may lurk, seemingly waiting for an opportunity to dash into the storage proper.

The major source of infestation in apple storages is those rodents, chiefly meadow and deer mice, that will be brought into the storage in boxes of apples. Meadow mice are apt to enter at any time boxed apples remaining undisturbed in the orchard. Deer mice like to make nests in those filled boxes that remain in the orchard overnight. Transportation of loaded boxes to the storage as soon as practical is the answer here, of course.

These suggested practices greatly reduce the danger of rodent infestation in a storage but many times mice will be found in a storage regardless of the care exercised to prevent it. The control methods remaining are the use of poison baits and gassing.

Strychnine-treated Steam Crushed Oats is the recommended bait for mouse control in storages. This material remains toxic longest under the humid conditions of the storage room. Teaspoonful quantities of the poisoned oats are placed at intervals along the walls, in alleys, or under pallets. The limited range or travel of these mice must be recognized. Every mouse should be able to find at least one bait within the circumference of its movements. Obviously this type of baiting must be done progressively as the storage is filled.

Gassing of an apple cold storage is an absolute control of all rodent species. Gassing with any material must be carefully done to prevent damage to fruit or injury to operator. Some additional equipment or minor alterations in construction may be necessary. For these reasons the services of a commercial exterminator should be considered.

The gassing of a storage demands that the room to be treated be reasonably gas-tight. Door and port gasket seals can be insured by applying a layer of vaseline where necessary. The use of one of two materials is recommended: (a) Methyl Bromide¹; or (b) Carbon Dioxide². Methyl Bromide should be used two or three weeks after apples cease to be brought in. This delay is desirable in order that the chemical will have no effect on the ripening of the fruit. Treatment with Carbon Dioxide has been found to be most effective immediately after loading ceases. Gassing with either should be made during humid, above-freezing weather so that proper ventilation can be secured afterward without injury to fruit.

Methyl Bromide is a colorless, odorless gas, available in pressurized cans or cylinders. It is toxic to all forms of animal life, and it has a delayed effect on humans. EXTREME CAUTION is necessary in its use. Equipment for gassing with Methyl Bromide includes a suitable applicator, a gas mask with proper organic vapor canisters, and a Methyl Bromide detector. Gassing can be accomplished from outside the room by using an applicator coupled with a copper tubing running through the storage wall. The tubing opening should be directly in front of a blower or auxiliary fan and circulating fans should be operating throughout the gassing period in order to assure uniform gas distribution. Methyl Bromide is applied at the rate of onequarter of a pound per 1,000 cubic feet of free air space. No injury to apples has been observed at this dosage in storages of normal temperatures (32-36°F.) and atmospheres. This gas concentration is maintained for five hours, followed by a complete air change by ventilation.

In order to insure proper ventilation, cross air currents from side-to-side or end-to-end are necessary. Forced draft by fans is desirable. Storage rooms which cannot be completely ventilated in about two hours should not be gassed with this material. Final check for the presence of Methyl Bromide must be made by an operator equipped with a gas mask and the special detector apparatus.

Carbon Dioxide is a natural product of respiration of both apples and humans and is not poisonous in the same sense as Methyl Bromide gas. However, in an atmosphere of high carbon dioxide concentration there remains little room for the oxygen necessary for the life of mammals, so that suffocation occurs. Gassing with Carbon Dioxide still requires CAUTION, as an error could prove fatal to humans--as well as to intended rodent victims. There is no chance of injury to the apples by the gas itself but efficient circulation near the source of Carbon Dioxide is a requirement to prevent localized freezing. Carbon Dioxide is applied in the form of "Dry ice", which is a solid at 110°F. below zero.

The storage room must be sealed tightly, as with Methyl Bromide. Fans, of household type or larger, should be placed so as to circulate air over each area where the dry ice is to be placed. Fifty-pound blocks of dry ice are placed in the storage passageways. These blocks should be handled only with ice tongs or very heavy gloves. Each block can be broken up into smaller pieces, with a heavy hammer, just prior to sealing. Proper carbon dioxide concentration (20%) is secured at the rate of 25-30 pounds of dry ice per 1,000 cubic feet. This concentration is maintained for about six hours. As with Methyl Bromide, complete ventilation is required before operators can enter the storage. But, unlike Methyl Bromide, it is not necessary that the Carbon Dioxide be evacuated immediately.

1/ Data on Methyl Bromide taken from literature prepared by Frank W. Southwick Research Professor of Pomology, Univ. of Massachusetts, Amherst, Mass.

2/ Data on Carbon Dioxide taken from literature prepared by Messrs. S. A. Pieniazek and Everett P. Christopher, Univ. of Rhode Island, Kingston, R.I.

--- W. R. Jones

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A TIMELY TIP

In Massachusetts red raspberry plants may be set in the fall. Probably the best time to set these plants is during the latter part of October, at which time dormant plants should be available. A small amount of mulch should be thrown over each plant before the ground freezes. This is done to help prevent heaving that results from alternate freezing and thawing of soils in late winter and spring.

However, don't just go out and set the plants without first preparing the ground properly. A red raspberry planting involves a considerable investment. Thorough preparation of the soil is necessary to get the plants off to a good start.

Details on the culture and management of a red raspberry planting may be obtained by writing your County Agent or the Extension Service, University of Massachusetts, for Leaflet #48 titled "Raspberry Growing".

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— W. J. Lord

HIGHLIGHTS OF THE NORTHEAST FRUIT TREE ROOTSTOCK CONFERENCE

The Northeast Fruit Tree Rootstock Conference was held in Maine during the week of August 15. At this conference, research workers who have rootstock projects met to observe the rootstock work in Maine and to discuss mutual problems in rootstock investigations.

The performance of hardy interstocks was observed at the University of Maine station and in several commercial orchards. It was of interest to note that Virginia Crab which has been used quite extensively as a hardy interstock is apparently either infected with a virus or is subject to a severe case of uncongeniality. Trees top worked on Virginia Crab are characterized by weak rubbery-like branches and the Virginia wood has a roughened and pitted appearance which is called "stem pitting." This condition does not generally appear until the trees come into production and then it becomes progressively worse with each crop until trees become so weak that they are utterly worthless. While the behavior of Virginia Crab is very similar to a virus disease described in England as "rubbery wood", as yet it has not been determined that Virginia Crab is infected with a virus. Whatever the trouble, it does mean that the Virginia Crab can no longer be used as a hardy stock.

In one commercial orchard a sizeable planting of Clark Dwarf trees was seen. The Clark Dwarf tree has a portion of its trunk made up of Virginia Crab. Many of these trees showed the "stem pitting" of the Virginia Crab stock and the weak rubbery branches, which would indicate that these Clark Dwarf trees are infected with the same trouble as the Virginia Crab hardy stocks. It is doubtful if this planting will ever live to maturity.

A sizeable young planting of semi-dwarf trees on Malling VII and II was observed in another grower's orchard. These trees were making excellent growth and had prospects for a good crop. The grower was very much pleased with their performance and plans to set more.

From the general discussion of the group, it appears that there is a renewed interest among fruit growers in planting new orchards on semi-dwarf rootstocks which will produce a smaller tree.

---W. D. Weeks

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POMOLOGICAL RESEARCH

7. The Cause of Unfruitfulness in the Beach Plum

Along the coastal plains of eastern North America from Virginia to New Brunswick there grows a small, native, bushlike plum called the beach plum (Prunus maritima). This is undoubtedly the plum which the Pilgrims found growing in abundance when they arrived in America.

Beach plums grow wild in more or less abundance along the seashore of eastern and southeastern Massachusetts. The bushes are very abundant on Cape Cod. The fruit is generally small and is extremely variable in ripening season, color, flavor and size. It is used mostly for making jelly and jam. Beach plum jelly is highly prized by many people. This has led to the development on Cape Cod of an extensive industry for the manufacture and sale of this product. A few superior types of wild bushes have been selected and named but these are grown on a very limited scale. Only a very few nurseries have named varieties of beach plums for sale and the supply is extremely small. As a result there are only a few regular plantings of beach plums and these are made up mostly of unnamed seedlings transplanted from the wild.

The beach plum has a variety of troubles but from the standpoint of the users of this fruit the worst is its failure to bear fruit more than once in three or four years in spite of a generally heavy annual bloom. The project under discussion is aimed at finding out why this is so and what can be done about it. A number of factors, each of which probably plays a part, are being studied and considerable progress has been made. Some of these factors are:

First, self unfruitfulness. It has been recognized for a number of years that most, if not all, beach plum bushes are self unfruitful. Cross pollination is required to produce a crop.

Second, biennial bearing. Many beach plums are definitely biennial in their bearing habit. Even where they are pruned, fertilized, sprayed and have adequate cross pollination, they will produce a crop only every other year.

Third, clones. Many beach plum seedlings sprout very freely from the roots which grow to considerable distances from the original bush. What appears to be a collection of seedlings is in reality a clone since all the plants arose from the same bush. Under these conditions crosspollination, which would usually result in fruit production, is not possible.

Fourth, cross incompatibility. It is strongly suspected that in some areas the beach plum bushes are so closely related genetically that cross pollination is not effective.

In relation to factors three and four it is significant that the use of bouquets of beach plum blossoms brought from a distance resulted in a heavy set of fruit on a group of bushes that had failed to produce a crop in 25 or 30 years although they had bloomed profusely every year.

Fifth, weather conditions. In the ~~coastal~~ areas the weather during the blooming season is often cold, rainy and windy. Such weather not only reduces insect activity and, thus, interferes with pollination but also may interfere with fertilization after pollination has taken place.

Sixth, fertilization. It would seem that fertilization should benefit a plant which grows in such poor soil as that where beach plums are usually found. Fertilizer experiments are under way. They indicate a possible increase in set of fruit following heavy nitrogen application.

Seventh, diseases. There are several diseases which attack beach plums. The worst is brown rot which also attacks cultivated plums, peaches and cherries. This disease attacks both blossoms and fruit. Not infrequently it destroys most or all of the crop. It can be controlled easily by spraying. Plum pockets, a disease seldom found on other plums, can be quite destructive if not controlled by spraying.

Eighth, insects. Of the several insects which attack beach plums the plum gouser and the plum curculio are the most serious. If not controlled by spraying, these two can ruin a large proportion of a crop.

Ninth, pruning. The most immediate benefit from pruning results from the removal of very low branches which are partially covered by grass, leaves, etc. This makes possible better spray coverage for the control of insects and diseases, particularly brown rot.

Near East Wareham there is a small planting of beach plums which were set out 25 or 30 years ago. The bushes are all wild seedlings collected from various places. This has assured adequate cross pollination. It is nearly surrounded by woods which act as a wind break and improve conditions for insect flight during bloom. In this planting it has been possible to produce three heavy crops in three years by fertilization, spraying and a very little pruning. The planting as a whole has borne heavy crops in spite of the fact that certain bushes are distinctly biennial. This shows that under proper conditions annual crops are possible.

John S. Bailey

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CATERING TO THE CONSUMER

Agricultural Information Bulletin #19 by the Bureau of Agricultural Economics, United States Department of Agriculture reports the results of a survey to determine consumer preference for apples and pears. In the survey the fruit buyers in 2,573 households thruout the United States were interviewed and here are a few of the more important things that they indicated they look for when they buy apples.

One out of three persons interviewed preferred apples to any other fruit and the major reason given for preferring apples are: taste, usefulness and versatility, and health.

They preferred eating and general purpose apples to varieties that are essentially bakers or cookers. When selecting apples in the store, condition, such as freedom from bruises, was most important. Good color was an important factor if they were purchasing eating apples while size and shape were particularly considered when purchasing apples for baking.

Pears were essentially a luxury item and the purchasers of pears preferred to have them ripe.

This study serves to emphasize how essential it is for the fruit grower who has apples to sell to provide the consumers with the kind of fruit they want and in the way they want it. The slogan "A satisfied customer is the best form of advertizing" may be trite and shop worn but it ever remains an effective way of increasing sales.

To provide consumers with types of apples that they want rather than those which the grower prefers to raise or think they should have appears to be of first importance.

The second essential is to get the fruit into the hands of the consumer in a sound condition free from blemishes. This calls for cooperative and persistent effort on the part of both grower and distributor.

—O. C. Roberts

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ORCHARD ENEMY NO. 1 FOR 1955

Two-spotted mite became very abundant in many Massachusetts apple orchards in mid and late summer. Extreme leaf yellowing followed by brown spotting and even defoliation and early fruit drop resulted.

Mineral deficiencies may be shown to have contributed to the abnormal condition in some orchards or on certain trees. Leaf analyses are being made to determine this.

Hot, dry conditions during July and early August were favorable for

2-spotted mites and their migration into trees. Drought conditions also may have increased the severity of damage resulting from mite activity or other possible causes.

There is strong evidence, however, that 2-spotted mites are the real culprits. I remarked in a Plymouth County orchard recently, "You have excellent foliage. Apparently mites did not cause you any trouble." And the grower replied, "I stopped them with two aramite sprays. Come over here where there are two poorly sprayed trees next the wall." We looked and there was the evidence - typical leaf yellowing, brown spotting and a high population of 2-spots.

It is well known that Aramite gives some of its best results when applied under hot, dry conditions against 2-spotted mite.

Additional evidence is found in some of our best commercial orchards sprayed with air-blast outfits. Here we can find tree after tree with just two areas of green, healthy foliage.

And where are those green leaves? Close over or beside the sprayer as it moved along between the trees. On those branches - and only on them was the coverage good enough to control 2-spotted mite.

Certain insecticide-fungicide spray programs are favorable for 2-spotted mite infestations. Repeated applications of DDT and methoxychlor plus hot, dry weather, are almost sure to increase troubles with 2-spots. There are observations indicating captan to have a similar effect. Many growers in 1955 combined these materials in repeated applications.

Lessons to Remember

1. Be prepared for trouble with 2-spotted mite if using a program of methoxychlor, DDT and perhaps captan.
2. Look for real trouble as the orchard ground cover dries up in late June, July and August.
3. You need the best material available. Aramite is preferred to malathion, parathion or TEPP unless aphids also must be controlled or it is rainy. Ovex at low concentrations, shows promise in a series of regular sprays. A newer material, chlorobenzilate, is comparable to or perhaps better than Aramite and may well prove very useful in '56. The systemic, demeton (Systox), may provide simplest and best control of both mites and aphids--
Handle with Care! It is very toxic.
4. Watch low hanging leaves, foliage on water sprouts and spurs and in top centers -- 2-spotted mite infestations start here.
5. Coverage underneath must be complete; failures to control 2-spotted in 1955 can be traced more often to poor application than to material. A big, powerful air-blast outfit poorly operated means just a gentle breeze to 2-spots over most of the tree.

6. Timing of successive applications must be right to obtain greatest effect; proper timing varies with materials and weather.

--- Ellsworth H. Wheeler

//////////

POWDERY MILDEW FOUND IN MASSACHUSETTS

Powdery mildew was found on terminal leaves and twigs of bearing apple trees in Worcester County by Bill Goss on August 26. We have been expecting it because other states near us, where organic fungicides have been used extensively for scab control, have had increasing amounts of it for several years. This is a serious disease and under the right conditions can cause heavy losses. Now it is here.

The powdery mildew fungus (Podosphaeria leucotricha) attacks the young tender leaves, twigs, blossoms, and fruit of apple. It grows mostly on the surface but it also penetrates into the soft tender tissues of the twigs and bud scales where it winters over to cause spring infections. The powdery spores are produced in abundance on the affected tissues and require very little moisture - light rains and even dew are sufficient - for germination.

The disease is usually more serious when it starts in the spring and there are frequent rains but it may start at anytime when tissues are soft and there is a little moisture.

What To Do !

1. Examine the orchard regularly for mildew - it starts as patches in a tree - and take care of them right away.
2. Prune out the infected terminals. The fungus will die in a few hours after the terminal is cut off.

In winter pruning, cut out all terminals which have a gray or silvery appearance. Pruning out is important because it reduces hold-over infections from which mildew starts in the spring.

3. In the spring, spray thoroughly with sulfur in pre-pink and pink, at which time mildew begins showing up, spacing sprays a week apart. Better kill will be obtained when temperatures are about 85° or low 90's, in which case it may be advisable to use 2 pounds of 325 mesh sulfur rather than the finer sulfurs. Growers who are on a sulfur scab control program, either alone or in combination, will not need to switch to sulfur during this period for powdery mildew control.

---C. J. Gilgut

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APPLE BOX DUMPING AIDS

Considerable apple bruising occurs when the fruit is dumped onto the receiving belt or the feed table of the grader. In many instances, when apples are dumped onto the grader, the boxes are held in such a way that the fruit falls from a height of several inches. A study of this operation made by Michigan State University showed that, on the average, each apple when dumped in this manner, received at least one bruise, a quarter of an inch or more in diameter.

How can the grower minimize the bruising that occurs when apples are dumped onto the grader? One of the first answers might be to use a reliable worker in this operation. However, when one stops to consider that hand lifting and dumping of apples onto the grader is one of the hardest and most tiring jobs in the entire apple packing procedure, it will be realized that even the most conscientious workers tend to tire and become careless. It is known that by placing one's hand and arm on the apples when they are being dumped, will reduce bruising considerably but as previously mentioned, fatigue leads to carelessness. Therefore, to answer the question on how the grower can minimize apple bruising; it can be best done by the use of some kind of a dumping aid.

The use of a pad placed over the top of an apple box when the worker tips the box can reduce bruising. After tipping the box, the worker should gradually raise the pad to allow the apples to roll gently onto the receiving belt or the feed table of the grader. Counter - balancing the pad makes it more convenient to use.

Another inexpensive dumping aid is a canvas bag. "The operator places a canvas bag, with one end tacked to the grader, over the top of the box of fruit while he tips the box over. Then he releases the bag and lifts the box gently to allow the apples to flow out."

Hand operated mechanical dumpers are available, being sold by various manufacturers. On the other hand, such a device may be constructed by growers who have access to a well-equipped farm shop. It is doubtful that the bruising is less with these mechanical dumpers than with careful hand dumping with a padded board but they do make it easier for the worker to do a better job with less exertion.

One type of dumping mechanism consists of a pivoted box holder, supported by a rigid frame in such a way that a filled box placed on the holder can be easily raised into dumping position and held. A strong coil spring assists in elevating and tipping of the box. An adjustable padded box lid holds the apples in the crate while the box is being positioned for dumping. During the dumping operation this hinged cover swings open allowing the apples to flow onto the receiving belt or feed table of the grader in a single layer.

Completely automatic box dumpers are available, also. These have been found to be satisfactory both from the standpoint of less bruising and economy of operation but are relatively expensive.

In conclusion, bruising of apples can be reduced considerably by use of relatively inexpensive dumping equipment. The use of a padded board or a canvas bag is an inexpensive investment that can pay big dividends. The use of a hand-operated mechanical dumper not only reduces bruising but helps the operator to do a better job with less exertion.

---W. J. Lord

//////////

WHAT HAPPENED IN THE THREE MILLION BUSHEL YEARS OF 1949-1951

An examination of out of storage movement and price in the years 1949, 1950 and 1951 may be of help to you in getting the most out of the 1955 crop.

First, let's look at the out of storage movement in the three years; second, we can look at the price in these years; and third, look at the price and movement together.

October crop estimates in the three years were: 1949 - 3,842,000 bushels; 1950 - 3,442,000 bushels; 1951 - 3,160,000 bushels.

There have been 31 Massachusetts apple crops over 3 million bushels in the 67 years since crop estimates have been available, and 7 crops over 3 million bushels since 1933 when crop estimates have been on their present commercial basis -- '39, '42, '44, '49, '50, '51, '55.

The October storage holding report for McIntosh in the Boston area for the three years gave these storage holdings: 1949 - 1,248,000 bushels; 1950 - 1,218,000 bushels; 1951 - 1,172,000 bushels.

Out of Storage Movement

1949 The storage holdings were quickly reduced with substantial withdrawals for four weeks, and a more than average rate of withdrawals for two weeks more. On January 1, there were only 47% as many McIntosh in storage as on October 15.

A slower than average rate of withdrawals in the following six weeks left about 19% of the McIntosh in storage on February 15. A spring spurt in withdrawals had removed all the 2% by April 1.

1950 This was an entirely different year. You will remember it as a difficult one. Storage withdrawals dragged from the start. So much so that on January 1, there was still over 55% of the October 15 quantity still in storage. By February 15, the situation was even further from average with nearly 32% of the October 15 holdings still in storage, against an average of 10 or 12%. One-fifth of the total holdings on hand on February 15, on top of normal holdings, proved to be very burdensome. By April 1, there was still 12% left in storage.

1951 The out of storage movement in this year was just about in between the previous two. The McIntosh were about one-half gone by January 1. Quantities were a little heavy on February 15 with 20% still in storage, but by April 1, all but 3% had moved.

Price

1949 The October 15 price on the Boston wholesale market for 2 1/2" up, firm, U. S. Fancy McIntosh was \$1.75. The price moved up to \$1.92 by November 1 and back to \$1.87 through January 15. On February 15, price was up to \$2.37, March 1, \$2.75 and March 15, \$3.25.

You will notice on the "PRICE CHANGE CHART" following, that the early rise to \$1.92 was quite unusual and could not be held. By February 15, soft McIntosh were clearly on a different price schedule and firm McIntosh headed for the "wild blue yonder".

1950 The second 3 million bushel crop year started lower with \$1.62. A comparison with a 25-year average indicates that it went up too fast and consequently held around \$2.00 until March 1 and then dropped back to \$1.87. Ripe apples, many held too long for a hoped-for rise, sold substantially lower.

1951 Price-wise, the third 3 million bushel crop year was a cross between the previous two. This crop started at \$1.90 and went to \$2.12 and \$2.37. On December 15, the price was down a quarter to \$2.12 and stayed at that level for two months. Again, ripe apples had their own lower price. Firm apples bounced to \$2.65 on March 1, to \$2.87 on March 15, and \$3.12 on April 1.

Out of Storage Movement - Price

There are many factors which affect price and every year they add up in a different way. The really amazing thing is the close relation between the price and movement AFTER October 15 when the price is usually stabilized.

Price behavior after October 15 seems to be very closely related to crop movement out of storage. Price or movement can be dominant factor. A price that is considered too high by the trade will slow movement, and a price which looks like a good buy to consumers will speed up consumption.

The amount and kind of sales promotion by growers is an important factor. There appears to be a rate of consumption for each crop year which is established in the fall and which persists throughout the year. A good healthy movement into consumption in the fall, consistent with the size of the crop to be moved, appears to be a basic requirement to a firm and rising price.

You as an individual grower can follow the price and movement of the crop as a whole and shape your own sales plan accordingly. If too many are being held, you can apply more pressure to sales and conversely if the movement is good (essential to a favorable spring price) you may wish to ease up a bit.

It is quite apparent that ripe (soft) apples do not move into consumption readily. Consumers apparently want crispness in apples. The record holds no hope for a late season gamble on ripe apples. It is suggested that you use the two charts accompanying this article to plan your own sales campaign. You can chart the price and movement of the deal as a whole and you can chart your own sales as a check on your operation. These two charts can make you money. Massachusetts is very fortunate in having apple market information on a current basis (Special Apple Market Report - Massachusetts Department of Agriculture) so that you can adjust your selling program to market conditions.

--- F. E. Cole

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HOWARD 17 Versus PREMIER STRAWBERRY

That these two strawberry varieties are one and the same was settled to the satisfaction of all concerned many years ago. However, at a recent meeting of small fruits specialists held in Michigan the question came up again because of the differences which have been observed between virus-free and ordinary stocks of this variety. There appears to be no doubt but that virus-free Howard 17 (Premier) are less desirable in several fruit characteristics including softness and tartness and that the plants have lighter colored leaves of different shape and fold than the regular stock of Howard. How these differences came about is not known but the fact that the differences are evident between the two stocks in Massachusetts, Maryland and Michigan gives no credence to the view that one maybe Howard 17 and the other Premier.

---A. P. French

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APPLE DROP

On September 1, the United States apple crop was estimated at 108,201,000 bushels. Since then it is estimated that this figure should be reduced by at least 3,701,000 bushels. The main cause for this reduction is the heavy McIntosh apple drop in the East.

It is reported that in Western New York McIntosh drop ranged from 20% to 25% to as high as 60% or more. The average for the region might approach 50% drop.

In Massachusetts, the stop-drop tests showed that 2,4,5 - TA was a failure this year. Apples on trees sprayed with 2,4,5 - TA dropped about as badly as those on non-sprayed trees which had 60% to 65% drop. Both NAA and 2,4,5 - TP were much more effective in experimental trials than 2,4,5 - TA but even where they were used drop was 20% to 25%.

With the previous stated facts in mind, anyone who lost less than 25% of their crop should feel fortunate.

--- W. J. Lord

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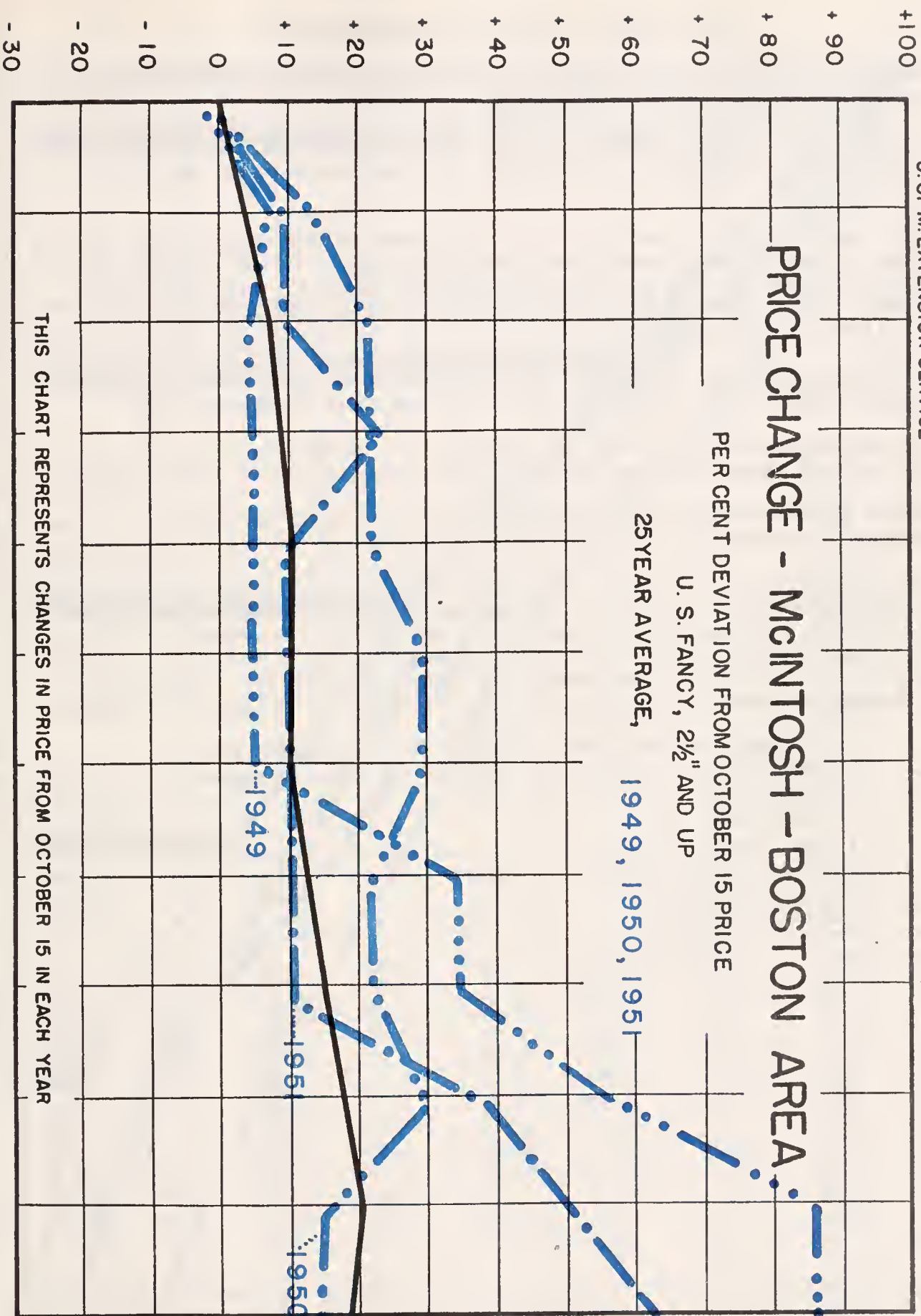
PER CENT
PRICE
CHANGE

U. OF M. EXTENSION SERVICE

M. D. A. SPECIAL APPLE MKT. REPT.

PRICE CHANGE - MCINTOSH - BOSTON AREA

PERCENT DEVIATION FROM OCTOBER 15 PRICE
U. S. FANCY, 2 1/2" AND UP
25 YEAR AVERAGE, 1949, 1950, 1951



THIS CHART REPRESENTS CHANGES IN PRICE FROM OCTOBER 15 IN EACH YEAR

PRICE CHANGE - MCINTOSH - BOSTON MARKET

Price changes and bushel movement are the gauges which indicate the success of the marketing and the returns to the growers.

Price changes reflect consumer demand. They indicate the willingness of the market to take the offerings. They indicate how well the growers are doing in selling the crop.

The season price may start high, low or in-between depending upon the size of the crop, consumer buying power, competitive prices and consumer desires. Desire to use buying power for the purchase of apples is largely the result of habit, competitive values, publicity, advertising as well as the attractiveness and availability of selling displays.

Current changes may be compared with the changes of other years on the basis of PER CENT CHANGE from the storage season starting price of October 15.

You can figure the per cent change and plot the changes on the chart in comparison with the twenty-five year average and the changes of the last two years.

Price information may be secured from the Special Apple Market Report of the Massachusetts Department of Agriculture.

The solid black line in the chart on the other side indicates the price changes of the firm McIntosh, U. S. Fancy - 2½" and up - Boston, through the period 1924-49. From October 15, the average price had increased to 7.4% on November 15, 10.6% on December 15, 10.1% on January 15, 15.2% on February 15, 20.7% on March 15, and 16.6% on April 15. This is the 25 year average or basic price pattern. 1952 and 1953 price changes have been included on this chart in green for purposes of comparison.

FIGURES USED IN MAKING THE CHART ON THE OPPOSITE SIDE Firm McIntosh, U. S. Fancy - 2½" and up - Boston Market -

Date	<u>1924-1949</u>		<u>1949</u>		<u>1950</u>		<u>1951</u>	
	25 Year Average Actual Prices	Percent Change 25 Year Average	Actual Price	Percent Change from Oct. 15	Actual Price	Percent Change from Oct. 15	Actual Price	Percent Change from Oct. 15
Oct.15	\$2.17	0.0%	\$1.75	0.0%	\$1.62	0.0%	\$1.90	0.0%
Nov.1	-	-	1.92	9.7%	1.87	15.4%	2.12	11.6%
Nov.15	2.33	7.4%	1.87	6.8%	2.00	23.4%	2.12	11.6%
Dec.1	-	-	1.87	6.8%	2.00	23.4%	2.37	24.7%
Dec.15	2.40	10.6%	1.87	6.8%	2.00	23.4%	2.12	11.6%
Jan.1	-	-	1.87	6.8%	2.12	30.8%	2.12	11.6%
Jan.15	2.39	10.1%	1.87	6.8%	2.12	30.8%	2.12	11.6%
Feb.1	-	-	2.37	35.4%	2.00	23.4%	2.12	11.6%
Feb.15	2.50	15.2%	2.37	35.4%	2.00	23.4%	2.12	11.6%
Mar.1	-	-	2.75	57.1%	2.12	30.8%	2.65	39.5%
Mar.15	2.62	20.7%	3.25	85.7%	1.87	15.4%	2.87	51.0%
Apr.1	-	-	3.25	85.7%	1.87	15.4%	3.12	64.2%
April.15	2.53	16.6%	-	-	-	-	-	-

Prepared by Frederick E. Cole, Extension Specialist, Fruit and Vegetable Marketing, September, 1955. University of Massachusetts, United States Department of Agriculture and County Extension Services Cooperating.

OUT-OF-STORAGE MOVEMENT--McINTOSH

1949, 1950 and 1951 - BOSTON AREA

STANDARD STORAGE LINE

FOR McINTOSH

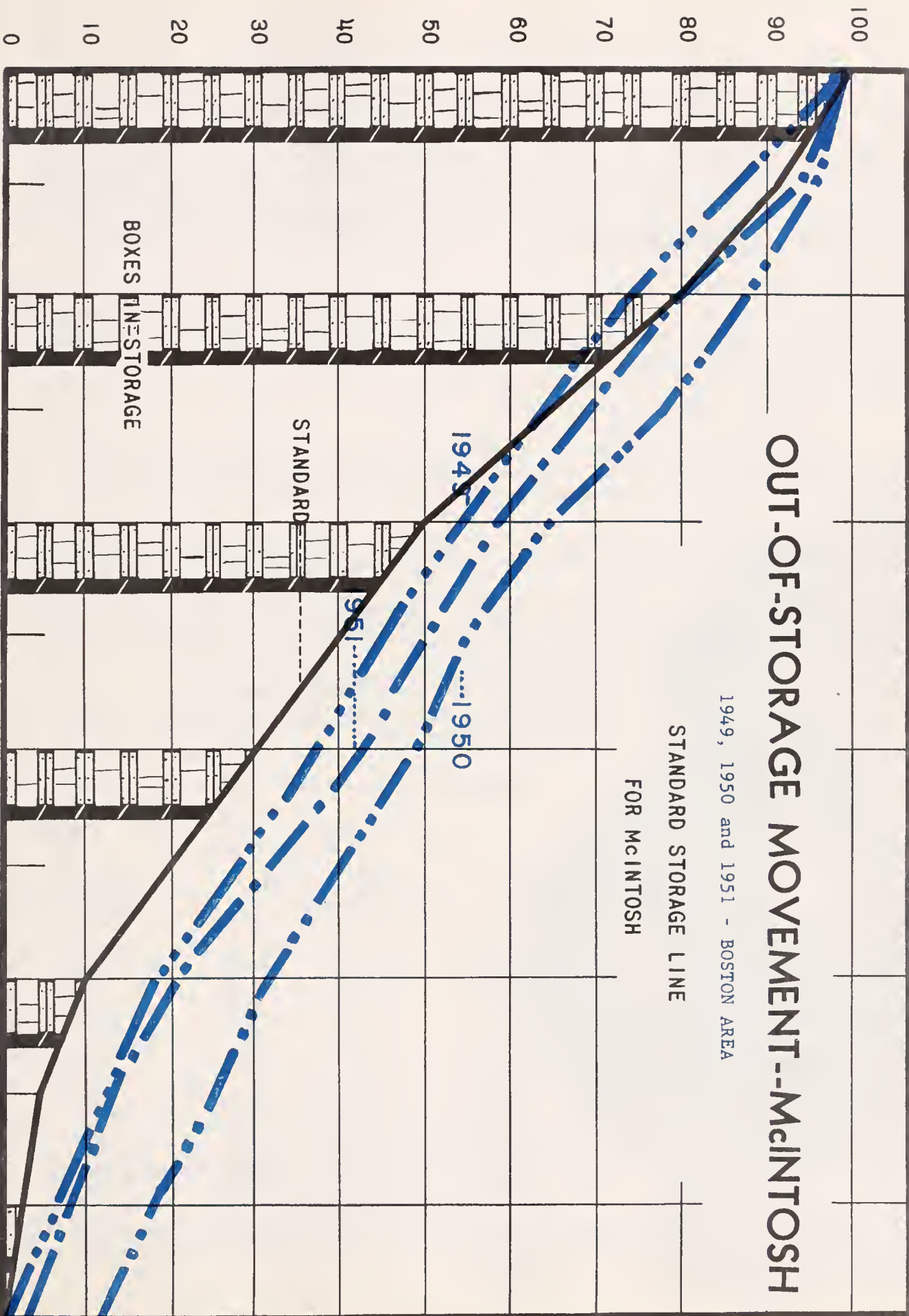
1949

1950

1951

STANDARD

BOXES IN STORAGE



THE MCINTOSH OUT-OF-STORAGE MOVEMENT CHART

The chart on the other side is helpful in deciding when to sell the crop, in order to get the most money out of it. The standard solid black line has proved to be a reliable guide. As each year is different, in at least some particulars, the selling plan should be based on market conditions and the out-of-storage movement of the current crop. By plotting the out-of-storage movement for the BOSTON AREA and your own out-of-storage movement, you can see how the current year is different from average and make your own decision as to what changes, if any, you want to make from standard practice.

The chart is based on selling one-third of the crop at harvest time, one-third before Christmas and one-third during the winter and spring months. The placing of the standard line also takes into consideration that apples move into consumption most rapidly at harvest time and in decreasing quantities as the marketing season progresses. A rising price, during the late fall and winter months is associated with the decreasing movement into market.

A successful marketing season depends upon the establishment of a good rate of apple consumption in the fall, in relation to the size of the crop, and the maintenance of a good rate of consumption throughout the marketing season.

This chart can help you to follow the out-of-storage movement of all McIntosh in the Boston Area and to make desirable adjustments in the movement of your own crop.

The information regarding total McIntosh movement in the Boston Area, as well as the rest of New England, can be obtained from the Special Apple Market Report of the Massachusetts Department of Agriculture.

MCINTOSH STORAGE HOLDINGS ON SPECIFIED DATES AND THE PER CENT OF SUCH HOLDINGS BASED UPON THE START OF THE STORAGE SEASON, OCTOBER 15

Boston Area - Massachusetts - Bushels

Date	Standard Per Cent	<u>1949</u>		<u>1950</u>		<u>1951</u>	
		Bushels (000)	Per Cent	Bushels (000)	Per Cent	Bushels (000)	Per Cent
Oct. 15	100%	1248	100.0%	1218	100.0%	1172	100.0%
Nov. 1	92%	1093	87.6%	1177	96.6%	1110	94.7%
Nov. 15	80%	934	74.8%	1077	88.4%	940	80.2%
Dec. 1	65%	804	64.4%	951	78.1%	814	69.5%
Dec. 15	50%	688	55.1%	793	65.1%	692	59.0%
Jan. 1	40%	584	46.8%	674	55.3%	596	50.9%
Jan. 15	30%	477	38.2%	606	49.8%	511	43.6%
Feb. 1	20%	350	28.0%	491	40.3%	378	32.3%
Feb. 15	10%	238	19.1%	389	31.9%	239	20.4%
Mar. 1	5%	160	12.8%	310	25.5%	159	13.6%
Mar. 15	2%	88	7.1%	220	18.1%	100	8.5%
Apr. 1	0	30	2.4%	147	12.1%	38	3.2%

Prepared by Frederick E. Cole, Extension Specialist, Fruit and Vegetable Marketing, September, 1955, University of Massachusetts, United States Department of Agriculture and County Extension Services Cooperating.

FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

NOVEMBER-DECEMBER, 1955

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FRUIT NOTES

November 1955

ORIGIN OF SOME APPLE VARIETIES

Several times in the last two months the author has been asked the origin of some of the apple varieties grown in Massachusetts. It is felt, therefore, that this information also might be of interest to many of the readers of Fruit Notes.

Most of the apple varieties planted in this country originated here, but the history of many is obscure and except for varieties more recently introduced few came into existence as the product of the plant breeder. Most of the varieties originated as chance seedlings and were discovered and introduced into cultivation by some observer and admirer of them. McIntosh, Delicious, Wealthy, Northern Spy and Baldwin are examples of commercial varieties that originated as chance seedlings.

There are also a number of bud sports of popular varieties on the market, for example: Galbraith Baldwin, Richared, Red Gravenstein and Red Spy. Most of these differ from the parent varieties only in higher color of the fruit.

The following is a list of some of the apple varieties ^{being sold} grown in Massachusetts and their origin. Some varieties resulted from a cross between two varieties. The origin of such varieties is expressed by placing the letter "X" between the parent varieties, for example; the Milton variety is a cross between Yellow Transparent X McIntosh.

McIntosh - Originated as a chance seedling in Dundas County, Ontario. Propagation of this variety began in about 1870.

Delicious - Originally distributed under the name Hawkeye, being discovered in Iowa in 1881.

Golden Delicious - Originated as a chance seedling in West Virginia. Introduced by Stark Brothers in 1916.

Starking ~~Double Red Delicious~~ - Bud mutation of Delicious. Originated in Monroeville, New Jersey, by Lewis Mood. Introduced commercially in 1924, trademarked 1930.

Cortland - Originated from the cross of Ben Davis X McIntosh. The cross was made at Geneva, New York, by the New York State Agricultural Experiment Station. Introduced for trial about 1915.

Early McIntosh - Yellow Transparent X McIntosh. Originated in Geneva, New York, by the New York State Agricultural Station. Introduced for trial in 1923.

Puritan - Originated from the cross McIntosh X Red Astrachan made by Professor F. C. Sears at the University of Massachusetts about 1929.

✓ Lodi - Montgomery X Yellow Transparent. Originated in Geneva, New York, by the New York State Agricultural Experiment Station. Introduced for trial in 1924.

✓ Macoun - McIntosh X Jersey Black. Originated in Geneva, New York, by the New York State Agricultural Experiment Station. Introduced for trial in 1923.

✓ Milton - Yellow Transparent X McIntosh. Originated in Geneva, New York, by the New York State Agricultural Experiment Station. Introduced for trial in 1923.

✓ Red Gravenstein - Bud mutation of Gravenstein. Originated in San Juan County, Washington. Introduced commercially in 1924.

✓ Roger's McIntosh - Bud mutation of McIntosh. Originated in Dansville, New York, by Isaac C. Rogers. Introduced commercially in 1932.

Melba - Open pollinated seedling of McIntosh. Originated in Ottawa, Ontario, Canada, by the Division of Horticulture, Central Experimental Farm. Introduced commercially about 1924

✓ Red Melba (Melred) - Origin unknown, but first noticed from a lot of nursery trees from the Wellington and Davidson Nurseries, Fonthill, Ontario, Canada. Introduced commercially in the 1940's.

Wealthy Double Red - Bud mutation of Wealthy. Originated in Sodus, New York, by James G. Case. Introduced commercially in 1940.

Galbraith Baldwin - Bud mutation of Baldwin. Originated in Amherst, Massachusetts Agricultural Experiment Station (Floyd Galbraith). Introduced commercially in 1948.

✓ Richared Delicious - Bud mutation of Delicious. Originated in Monitor, Washington. Introduced commercially in 1926.

✓ Northern Spy - Originated in a seedling orchard at East Bloomfield, New York. In 1852, the American Pomological Society listed it as a new variety of promise.

Northwestern Greening - Originated in Waupaca County, Wisconsin. Introduced in 1872.

✓ Baldwin - A chance seedling in an orchard at Wilmington, Massachusetts. Propagated and widely introduced in Eastern Massachusetts as early as 1784.

✓ Winter Banana - Originated on a farm near Adamsboro, Cass County, Indiana about 1876. Introduced in 1890.

✓ Rhode Island Greening - Locality of the origin is not known with certainty but probably originated in the vicinity of Newport, Rhode Island.

✓ Roxbury Russet - It is thought that this variety originated in Roxbury, Massachusetts, early in the seventeenth century.

Williams - Originated in Roxbury, Massachusetts. It was brought to the attention of the Massachusetts Society in 1830.

✓ Wealthy - Originated by Peter M. Gideon, Excelsior, Minnesota from seed of the Cherry Crab about 1860.

Wolf River - Originated near Wolf River, Wisconsin. Catalogued by the American Pomological Society in 1881.

Yellow Transparent - Imported from Russia by the United States Department of Agriculture in 1870.

Red Astrachan - A Russian apple imported by the Massachusetts Horticultural Society in 1835.

✓ Rome - Originated in Lawrence County, Ohio, before 1848.

--- W. J. Lord

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MURIATE vs SULFATE FORM OF POTASSIUM

Some of you older fruit growers may remember the Old Station Orchard in which a fertilizer experiment was started in 1890 one purpose of which was to determine the relative value of muriate of potash and sulfate of potash for orchard purposes. Even though tree growth and yield were greater on the sulfate plot the design of the experiment was inadequate to justify positive conclusion to be drawn.

In a later experiment in which raspberries were included winter injury was found to be considerable greater on muriate plots than the sulfate ones with resulting material increase in yield on the sulfate plots.

At the recent meeting of the American Society for Horticultural Science, Dr. Shaulis of New York reported on a carefully designed experiment with red currants conducted in the state over a seven year period. He stated definitely that muriate of potash is inferior to sulfate of potash for that fruit crop because the muriate causes a marginal scorch of the foliage, retards bush growth and is associated with a yield decrease of about 20%. Leaf analyses showed a greater accumulation of chlorides in the foliage of the muriate - treated bushes than on any other plot.

So maybe there is a difference in value of these two forms of potash for some fruit crops.

--- A. P. French

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CHEMICAL AND PHYSICAL CHANGES IN APPLES DURING STORAGE

The function of cold storages is well known to the fruit grower. It is known that apples must be stored if the fruit is to be kept in good saleable condition during the winter and spring months which is to the mutual benefit of both the grower and consumer. What is less well known to the fruit grower is the chemical and physical changes in the apples during storage.

First it must be realized that the apple is alive even though it has been picked from the tree. Apples continually carry on respiration which consists of the intake of oxygen and the giving - off of carbon dioxide through the skin, other words they breathe. In addition to the carbon dioxide, water vapor, volatile substances and heat also are given off as products. The rate the breathing or respiration depends on the temperature at which they are stored. At ordinary room temperatures, apple respire much more rapidly than at storage temperatures of 31° to 32° F. The faster an apple respire, the faster it ripens.

What else takes place in the ripening process of apples during storage? When an apple is harvested its tissue consists largely of water and such carbohydrates as sugars in the form of sucrose and reducing sugars, fruit acids, and in between the cell walls, cellulose like substances (protopectin and pectates) from which pectins are produced. Pectin is found only in low concentrations at the time the apple is picked.

After the apple is removed from the tree a series of complex chemical changes take place. Starch is converted to sugar; rate of respiration increases; ethylene and other gases are evolved; changes take place in fruit color; sugars change form; acids decrease; and protopectin is converted to pectin.

During storage there is a continued change from green color to yellow color on the unblushed side of the fruit. While the red color of apples may increase at room temperature after picking, there is no increase after the fruit has been placed in storage.

At the time the apple is at commercial maturity, it contains alot of protopectin and pectin and an appreciable amount of pectate. These pectic substances cement the cells together and this adhesion is responsible for the firmness and crispness of the apple flesh. As the fruit continues to ripen, the pectic substances are lost at a progressively increasing rate. With the dissolution of the pectate between the cell walls, the cells of the overripe fruit become loosened or even completely freed from one another, and the fruit becomes soft and mealy. Similar changes take place during the ripening of the pear and peach.

In a recent Technical Bulletin published by the Unites States Department of Agriculture, it was found that reducing sugars tended to increase during storage while sucrose increased only during the first 1 or 2 months in the apple varieties tested. Total sugar increased while acidity decreased during storage.

In conclusion, the stored apple is a living thing and carries on respiration, a process fundamental to all living things. This process is necessary in order that the fruit will obtain the proper stage of maturity. Respiration is retarded as the temperature is lowered; therefore, the sooner heat is removed from fruit after harvest and the optimum storage temperature is attained, the earlier the ripening processes will be arrested and the longer the fruit can be kept.

--- W. J. Lord

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ELECTRICITY - FRIEND OR FOE

Electricity is useful and safe when properly handled. Learn to use it safely. Use electric heaters in bathrooms and laundries with care. People have been killed by touching these electric heaters while they are in the bath. Electric bulbs have been known to explode and start a fire when they are used to dry clothes or to warm the bed. Never allow dust to accumulate on an electric bulb. It may cause it to explode in the barn or the attic and start a fire.

No doubt, you can think of some fire in your neighborhood that has been caused by electric irons, toasters or curling irons having been left connected. Be sure to turn off the switch or disconnect them when leaving the room. This is a must. Keep a sufficient number of 15 amp. fuses on hand to replace those that burn out. Many people are very prone to place pennies and other metal behind the fuse which overloads the circuit and causes a fire.

Be sure that the wiring in the house, particularly the lamp cords, are replaced if badly frayed. Employ an expert electrician to replace wiring in the home.

I ran across the other day, a very excellent safety suggestion for parents and baby sitters. Caution the baby sitter against permitting the child to play with matches or electric appliances. Children have been known to put their fingers into electric light sockets causing a short circuit, badly burning the child, and sometimes causing the death of the child; so caution the baby sitters against allowing the children to play with the fixtures.

In case you found some member of your family unconscious because of electric shock and still in contact with the live wire, what would you do to break the contact? The best and safest method to break such a contact is to knock the wire free or pull the victim away by using non-conductive materials as a rake, broom, dry branch, dry rope or just the overcoat. Don't, under any circumstances, allow your body to come in contact with the person who's still in contact with the live wire.

---R. B. Parmenter

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POMOLOGICAL RESEARCH

8. The Nutrition of Apple Trees

In 1948, the project entitled "The Nutrition of Apple Trees" was initiated. The major objective of this project was to determine the kinds and amounts of fertilizer which are required to produce vigorous healthy trees capable of producing maximum yields of high quality fruit.

In conducting the project a new approach was made in determining the effectiveness of the different fertilizer treatments. The actual amounts of the different mineral elements found in the leaves were determined by chemical analyses. The chemical composition of the foliage was used to determine the effectiveness of the several fertilizer treatments and to study the relation of the treatments to tree performance, quality of fruit, and to determine deficiencies and excesses. While it is not possible in an article of this nature to discuss all the results of the project, some of the important findings may be mentioned at this time.

The results clearly demonstrated the need for considering elements other than nitrogen in developing a fertilizer program. The need for applying adequate amounts of potassium was first established by leaf analysis and and then by tree performance and fruit quality. It was found that high rates of nitrogen fertilization increased the potassium requirements of the tree, and if these requirements were not met the appearance of potassium deficiency was hastened.

Fruit color was found to be associated with both the nitrogen and the potassium levels found in the foliage. The poorest colored fruit was produced by trees which were high in nitrogen and low in potassium. Fruit of high color was produced by trees with medium levels of nitrogen and high levels of potassium.

Fruit from high nitrogen trees was considerably softer than those from medium nitrogen trees and had a shorter storage life. High rates of nitrogen fertilization gave somewhat increased yields and tree growth but when the color and quality of the fruit was taken into consideration the increase yields became of questionable value. Annual production was not maintained by high rates of nitrogen and it was only when crop size was controlled by chemical thinning that trees were made annual.

Magnesium requirements were taken care of if adequate amounts of high magnesium were applied to the soil.

Since this experiment was conducted with McIntosh, the results apply most specifically to that variety. Although most of the results can be applied in a general way to other varieties, we believe they must be modified to meet specific requirements of each variety. In order to determine if other varieties have different nutritional requirements, we are initiating a nutritional project along similar lines with Delicious.

---W. D. Weeks

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A STATEWIDE LOOK AT CULTIVATED BLUEBERRIES

It is no secret that we know far too little about fertilizing cultivated blueberries. However, our present recommendations as to what kind of fertilizer, how much and when to apply are not entirely guess work. They are based on experimental evidence but this evidence is far too limited for our needs. A new project was started this past summer the results of which will give the basic information needed to answer the questions about fertilizing blueberries with more assurance,

In connection with this project leaf samples from blueberry plantings scattered over the entire state were collected. These will be analysed chemically for certain elements and this information used as a basis for further work. This state wide survey made it possible to get a broad look at how blueberry plantings are being handled and how they are responding. As a result certain observations seem worth noting.

First, Cultivation vs Sod. Many blueberry plantings have been allowed to sod over because of the high cost of labor and machinery to cultivate. Although, the grower may "get by" with sod culture, especially with heavy fertilization and plenty of moisture, in the long run cultivation will probably produce more growth and heavier yields.

Second, Mulching vs Cultivation. Where it can be done economically mulching has a distinct advantage particularly the use of sawdust or shavings. In many places the cost is too high to be justified by the benefits obtained. In some plantings the combination of mulching a strip along the rows and cultivation between the rows has proved to be very satisfactory.

Third, Fertilizer. It was surprising to learn how few growers know how much fertilizer they put on in terms of pounds per acre. In most cases the amount of fertilizer applied is on the light side, especially where plantings are in sod. Where nitrogen has been applied in the ammonia form the results have been very good.

Fourth, Pruning. Few growers do an adequate job of pruning. This results in overbearing, small fruit and weakened bushes.

Fifth, Spacing. Most plantings are set too close to allow for efficient machine operations when the bushes reach full size. In the plantings set recently wider spacing is generally used. Older plantings present problems in spacing which will require some study on the part of the grower.

These are some of the important observations made during last summer's blueberry work. They are stated here very briefly. Later some or perhaps all of them will be discussed at greater length in "Fruit Notes".

---John S. Bailey

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CIDER NOTES

IDEAS

During a visit to a cider mill, two inventions were noticed that speeded up work in the mill.

Label Remover - to do away with this wet and time consuming chore, an electric motor (approx. 1/2 h.p.) was setup with a round wire brush, like those used to remove burrs on metal. The jig is held against the rotating bristles - presto - no label! Shield the setup, as the torn paper flies about.

Jug Cleaner - After soaking or when ready to wash the jug, place some detergent-sanitizer solution in the jug, then use this idea. Get a long spindle (one that will reach the bottom of a gallon container) for a 1/4 in. drill. Split the end with a hacksaw for a depth of 4-5 inches. Insert in the slot some long strips of rubber inner tubing and fasten by tightening a nut and bolt placed through the end. The strips should be about 1 in. by 9-10 in. Place spindle in drill, insert in jug and turn on switch. The fast moving strips will remove the dirt and let the cleaner work faster.

Be sure that drill is grounded and is not operated when hands are wet.

Certification Program - Many mill operators are showing interest in the certification program and more are under the program this year than last.

Several questions on the certification procedure have come up. One that seems bothersome is the physical examination requirement - this is included to acquaint you with the law that states either the Department of Public Health or the local board of health may require an employee to have a physical examination. It is also possible that local regulations may require an examination for a person working in a food plant.

Another question is on labels - the law does require a label showing the name and address of the person who packed or sells them.

---K. M. Hayes

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THE APPLE DROP IN 1955

Since we have just passed through one of the most serious seasons for fruit drop in recent years perhaps some of you may be interested in an attempt to explain why this situation existed and what, if any, good stop-drop materials did in counteracting this situation. As this story is told it will be apparent that our hindsight was somewhat better than our foresight.

It may be said, if this is any comfort to you, that McIntosh drop this fall was as serious, if not more so, in all northeastern McIntosh growing areas as it was in Massachusetts. I have correspondence from people in New York stating that losses in parts of the Hudson Valley and Western New York were as high as 60 per cent of the total crop. Apparently McIntosh drop in Michigan was severe, also.

Some things which stand out about the McIntosh drop this year are that the drop started earlier than usual and that the early drop was unusually heavy. Generally, in Massachusetts a few apples commenced to drop around the 8th to the 12th of September and as the season progressed the drop intensified. This year the drop started off with a "bang". By the 12th of September, 1955 in one orchard where we had an experiment underway, over 15% of the crop had already fallen from non-hormone sprayed trees. By the 23rd day of the month 65% of the crop on such trees had fallen. I am inclined to think that two major factors were involved. First, we had a tremendous crop of McIntosh and I believe most growers recognize that a heavy McIntosh crop and heavy drop often go hand in hand unless we have unusually cool weather in September. Also, we had an unusually hot July and early August, with mean temperatures during this period about 6 degrees above normal, perhaps the highest mean temperature for this period on record. Such high temperatures may be expected to hasten ripening and advance the maturity date. In other words, McIntosh were perhaps 7 to 10 days ahead of their average maturity date as far as firmness and ground color were concerned but good red color did not develop until the usual time. Generally speaking, ripe apples drop sooner than less mature fruits and this advanced maturity may explain the heavy early drop.

As you all know, many orchards suffered from foliage injury in varying degree. This injury may have been due in part to the effects of the early drought - trees carrying a heavy crop suffer much more from drought than trees bearing a moderate or light crop. Also, mites and possibly nutritional deficiencies may have accounted for considerable amounts of foliage damage. It is well known that apples frequently "rain off" trees when the foliage is injured. However, serious drop existed in many blocks where the foliage appeared to be in excellent shape.

Fortunately, we realized that this might be a good year to test stop-drop materials and we had two experiments on McIntosh going when growers began to realize the seriousness of the drop. Unfortunately, however, we had considerable confidence in 2,4,5-TA as a stop-drop material for McIntosh. It had performed well in the past and had caused only slight ripening. Consequently, we recommended its use on McIntosh for those growers who wished to control drop for about 3 weeks.

Table 1. Effect of Hormones on Drop of McIntosh

	Date applied	Av. No. bu./tree	Cumulative % drop							Av. flesh firmness
			September							
			12	16	19	21	23	26	28	
1. Check		30.7	9.0	18.0	30.9	39.2	41.7	49.4	59.9	14.2
2. NAA + NAA & 2,4,5-TP	9/8 9/19	31.3	4.5	6.9	14.7	21.2	23.1	24.2	25.4	13.3
3. 2,4,5-TA + NAA	9/8 9/19	34.2	9.3	17.6	25.9	29.0	29.7	32.0	32.5	13.3
4. 2,4,5-TP	9/8	29.7	5.0	6.9	8.6	10.2	11.1	12.2	22.8	10.5
5. 2,4,5-TAA + NAA	9/8 9/19	33.2	9.9	18.5	25.9	28.4	29.0	29.5	30.0	12.5

As can be seen by the data in Table 1, both 2,4,5-TA and 2,4,5-TAA (a new material) which were applied September 8 (treatments 3 and 5 were completely ineffective up through September 19. In fact, by September 16, it was obvious that 2,4,5-TA, which was used extensively by growers, was not working. Since our data show that NAA (treatment 2) was doing well for about 10 days, we suggested to all growers in this predicament that NAA be applied immediately. 2,4,5-TP (treatment 4) was not suggested at this time because, even though it was doing an excellent job of controlling drop, we were not sure that trees ought to be subjected to both 2,4,5-TA and 2,4,5-TP, it takes several days to become effect, and because TP is more of a ripener than NAA.

On September 19 we applied NAA to treatments which had received 2,4,5-TA (treatment 3) and 2,4,5-TAA (treatment 5) to see if our suggestion to growers was worth anything. As can be seen by the data, the use of NAA was very much worthwhile. From September 19 to 28, inclusive, only 6.6 and 4.1 per cent of the crop fell from the trees originally sprayed with TA and TAA, respectively, whereas 29.0% fell from the checks (treatment 1) during the same period. The trees receiving NAA originally (treatment 2) began to drop badly after September 16, when the NAA "ran out" so a mixture of single strength NAA and 2,4,5-TP was reapplied to them on September 19. This combination was used to give quick holding (from the NAA) and to see if the TP would eventually control drop. This mixture worked quite well and the addition of TP at this late date did not hasten ripening any more than any other treatment. Actually the test did not run long enough to determine how long this late TP application would be effective. 2,4,5-TP, when applied on September 8, (treatment 4), held the fruit on the trees very well through September 26 but "ran out" by the 28th of the month. Unfortunately, this material, when applied 3 weeks ahead of harvest, resulted in much ripening, water core, and fruit splitting. If it were not for the marked ripening influence which this material exhibits after it has been on the trees longer than two weeks, it would be an excellent material to use for drop control of McIntosh.

We have no good answer for why 2,4,5-TA failed this year when both NAA and 2,4,5-TP were reasonably effective on McIntosh. Apparently, the trouble with TA is not related to any particular formulation or manufacturers product or brand. It apparently failed in many orchards throughout the Northeastern McIntosh area regardless of which brand was used. One possibility suggested by one experimenter is that TA for some unknown reason was not absorbed by the foliage as readily as NAA or 2,4,5-TP.

Many growers were disappointed with TP on Baldwin this year, also. Last year we found TP to be very effective on this variety for about a month after application. This year, on the basis of the early drop of McIntosh, many growers applied TP to Baldwin about September 20, in order to prevent the possibility of an early drop of Baldwin, which they feared might take place. Treatments at this time appeared to run out by Columbus Day or 7 to 10 days before we thought it would on the basis of last year's results. In other words, in the absence of any test data, it is our guess that TP held Baldwin well for a time but its period of effectiveness was shorter than anticipated this year. This year it now appears that it might have been best to have delayed the application of TP on Baldwin until about October 1. This, of course, represents another example of knowing what should have been done after the horse was stolen. On Delicious, all reports we have received indicate that 2,4,5-TP did a good job of controlling the drop of this variety.

---F. W. Southwick

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F.F.A. FRUIT JUDGING CONTEST

The annual F.F.A. Fruit Judging Contest was held at the University of Massachusetts October 28. Nine teams of three boys each were in competition this year. These teams were from the following schools: Arms Academy, Charlton High School, Essex County Agricultural School, Hudson High School, New Salem Academy, Norfolk County Agricultural School, Templeton High School, Wachusett High School and Worcester North High School.

In this contest the boys endeavored to identify forty-five specimens of apple and pear varieties, fifteen specimens of insects and diseases, fifteen lots of apples as to grade and judge four classes of apples with three plates in each class.

Templeton High School won the contest with a score of 3,594 points out of a possible 4,350.

David Rossbach of Templeton High School had the highest individual score with 1,310 points out of a possible 1,450.

These winners will defend their crowns at a similar contest to be held at Worcester North High School on January 4, 1956, during the Union Agricultural Meetings.

--- O. C. Roberts

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PACK FOR TOP MARKET!

A PRACTICAL INTERPRETATION OF THE U.S. NO. 1 GRADE FOR APPLES

ONE VARIETY — MATURE, but not overripe — **HAND PICKED**, showing no evidence of rough handling or having been on the ground — **CLEAN**, free of dirt, residues and other material — **WELL FORMED** — **FACE OF THE PACKAGE** shall represent size, color and quality of the contents — Packages shall be **WELL FILLED** — The **COUNT** or **MINIMUM DIAMETER** shall be stated on closed containers. If count is stated, maximum size variation shall not be more than $\frac{1}{4}$ inch in diameter. **Size Tolerance**: minimum not more than 5% — maximum, if used, not more than 10%.

COLOR — minimum requirements:

- **RED SPORT VARIETIES** such as Red Rome 25% of surface.
- **McINTOSH, CORTLAND** and similar varieties 25% of surface.
- **BALDWIN, DELICIOUS, WEALTHY** and similar varieties 15% of surface.

3/16 inch

DAMAGE — maximum limits permitted in this grade:

- Group 1** - **SMOOTH, NET-LIKE RUSSETTING** total area 25% of surface.
- SOLID RUSSETTING** total area 10% of surface.
- SLIGHTLY ROUGH RUSSETTING** total area $\frac{1}{2}$ inch in diameter.
- ROUGH RUSSETTING** total area $\frac{1}{4}$ inch in diameter.

1/4 inch

- Group 2** - **SCAB AND CEDAR RUST** total area $\frac{1}{4}$ inch in diameter.
- HEALED INSECT STINGS** total area 3/16 inch in diameter.
- LIMB RUB** total area $\frac{1}{2}$ inch in diameter.

1/2 inch

HAIL or DROUGHT SPOT, none more than superficial or total area of $\frac{1}{2}$ inch in diameter.

Free from noticeable **SOOTY BLOTCH, SUNBURN, SPRAY BURN, or RED SPOTS** from Scale.

Free from **OTHER INSECT, DISEASE, and MECHANICAL** damage. A combination of defects in this group is allowed if total seriousness does not exceed that allowed for any one defect.

Group 3 - Free from all except a few shallow and inconspicuous **BRUISES**.

Group 4 - Free from **DECAY, INTERNAL BREAKDOWN and BROWNING, BITTER PIT, JONATHAN SPOT, SCALD, FREEZING INJURY, WATER CORE, BROKEN SKIN, WORM HOLES, and APPLE MAGGOT**.

GRADE TOLERANCE: - Not more than a **TOTAL OF 10%** of the apples in any lot may be below the grade requirements.

Provided that: - Not more than 1% may be affected with decay or internal breakdown.

and: - Not more than 5% may be damaged by insects in excess of the limits stated for this grade.

The percentage out-of-grade shall be calculated on the basis of count when count is stated, on the basis of weight when size is stated.

FOR COMPLETE INFORMATION SEE OFFICIAL GRADE SPECIFICATIONS

A PACKING HOUSE POSTER

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PACK FOR TOP MARKET!

A PRACTICAL INTERPRETATION OF THE U.S. FANCY GRADE APPLES

ONE VARIETY — MATURE, but not overripe — **HAND PICKED**, showing no evidence of rough handling or having been on the ground — **CLEAN**, free of dirt, residues and other material — **WELL FORMED** — **FACE OF THE PACKAGE** shall represent size, color and quality of the contents — Packages shall be **WELL FILLED** — The **COUNT** or **MINIMUM DIAMETER** shall be stated on closed containers. If count is stated, maximum size variation shall not be more than $\frac{1}{4}$ inch in diameter. **Size Tolerance**: minimum not more than 5% — maximum, if used, not more than 10%.

COLOR — minimum requirements:

- **RED SPORT** varieties such as Red Rome 50% of surface.
- **McINTOSH, CORTLAND** and similar varieties 33% of surface.
- **BALDWIN, DELICIOUS, WEALTHY** and similar varieties 25% of surface.


 3/16 inch

DAMAGE — maximum limits permitted in this grade:

- Group 1** - **SMOOTH, NET-LIKE RUSSETTING** total area 15% of surface.
- SOLID RUSSETTING** total area 5% of surface.
- SLIGHTLY ROUGH RUSSETTING** total area $\frac{1}{2}$ inch in diameter.
- ROUGH RUSSETTING** total area $\frac{1}{4}$ inch in diameter.

 1/4 inch

- Group 2** - **SCAB AND CEDAR RUST** total area $\frac{1}{4}$ inch in diameter.
- HEALED INSECT STINGS** total area 3/16 inch in diameter.
- LIMB RUB** total area $\frac{1}{2}$ inch in diameter.

 1/2 inch

HAIL or DROUGHT SPOTS, none more than superficial or total area of $\frac{1}{2}$ inch in diameter.

Free from noticeable **SOOTY BLOTCH, SUNBURN, SPRAY BURN, or RED SPOTS** from Scale.

Free from **OTHER INSECT, DISEASE, and MECHANICAL** damage. A combination of defects in this group is allowed if total seriousness does not exceed that allowed for any one defect.

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FOR COMPLETE INFORMATION SEE OFFICIAL GRADE SPECIFICATIONS

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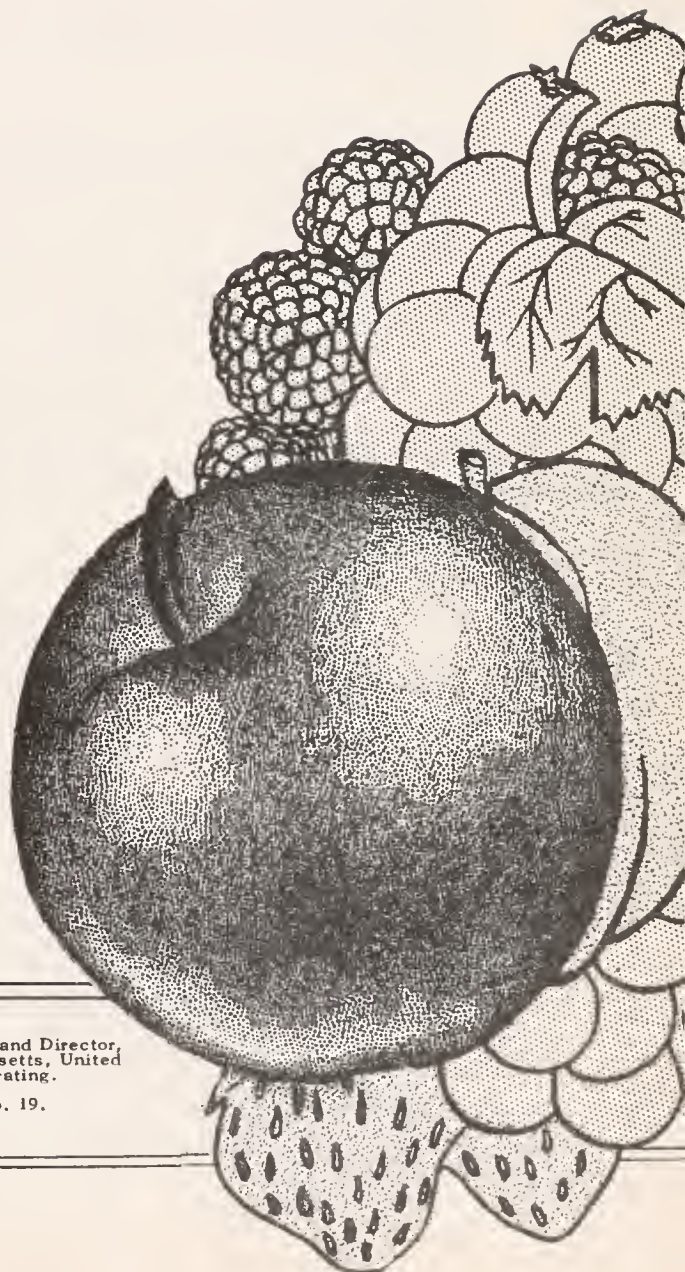
FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

JANUARY 15, 1956

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FRUIT NOTES

January 1956

APPLE STORAGE SCALD

The severity of apple storage scald is greatly influenced by the type of growing season. In other words, the fruit is somewhat predisposed to scald before it ever enters the storage. However, there are some things a grower may do to reduce its severity even in bad scald years.

It is the purpose of this brief report to discuss some of the factors which influence scald and the value of present scald control measures.

A. Orchard Factors:

1. Variety. In Massachusetts by far the most susceptible variety is Cortland. This variety tends to develop scald rather early in the storage season (often by December or January) and to develop a dark brown, somewhat sunken type of scald. Both R.I.Greening and Rome are subject to this disorder but except for a relatively few growers the volume of Rome and R.I.Greening in Massachusetts is small. Such varieties as McIntosh, Delicious, Golden Delicious, and Baldwin are not usually affected.

2. Season. There is some indication that scald is apt to be worse following growing seasons that have been warmer than usual. If this is true one would expect more scald to develop this year than last. Scald on Cortland has already appeared (after fruit was held at room temperature for 5 days) on 4 out of 11 samples of Cortland taken by Dr. Bill Lord from storages in six counties in December, 1955. Last year Cortland did not begin to scald until February.

3. Fertilizer Program. Actually very little experimental work has been done relating nutritional status of the tree to incidence of scald. However, some work has been done relating nitrogen level of the tree with severity of scald. The findings from these studies do not indicate any close correlation between nitrogen level and scald development. The influence of other elements such as potassium, magnesium, boron, etc. is open to investigation.

4. Maturity of the Fruit At Harvest. The influence of maturity is well known. Immature apples almost always scald more than more mature lots.

B. Storage Factors

1. Temperature. It is commonly stated that apples held at 32° F. will scald less than fruit held at 36-40° F. It is desirable to cool apples as quickly as possible to 32° F. to reduce the rate of ripening and softening as much as possible. However, recent work at Amherst does not seem to substantiate the claim that apples will always scald more when held at 40° F. than at 32° F.

2. Apple Volatiles. It is the opinion of many that storage scald is caused by organic gases produced by apples. It has been possible, for example, to increase the amount of scald on a firm lot of apples by passing vapors from ripe

apples over them. The recent work at Rhode Island where investigators have removed some or all of the cuticle and obtained marked reductions in scald indicates that volatiles from riper apples are not the sole cause of scald. Also, we found that packing Cortland apples in activated coconut shell carbon did not control scald. It is apparent that there is still much to learn about the causal agents of scald.

C. What can a grower do to keep track of scald development and control it?

The best way to keep track of scald development is to remove apples of scald susceptible varieties from cold storage every two weeks and hold them for five days at room temperature. Apples may appear to be free of scald in storage and yet show as much as 100% scald after several days at 70-80° F. This sort of checking should be started in December and continued as long as the susceptible variety is in storage. Obviously, prompt movement of any variety showing scald is desirable.

As far as controls go, a grower of scald susceptible varieties should not pick them when immature. Of course, he has to be careful that they are not allowed to become over ripe. Another method of control is the use of oiled paper, either as wraps or as shredded paper. This treatment must be done before the fruit enters the storage in order to be most effective. Since most of our apples are stored orchard run and packed out-of-storage most growers are not enthusiastic about the use of oiled paper since it means another operation and expense during the rush at harvest time. Also, oiled paper may reduce scald somewhat but often will not give adequate control.

At one time we had hopes that coconut shell air purifiers would be of value in controlling scald. Their value for this purpose is limited, however. Air purifiers will often fail to control scald on Cortland.

As you can see, present scald control methods are far from satisfactory. However, recent research being conducted here and in neighboring states indicate that better control methods may be developed soon. A spray treatment which can be applied just prior to harvest is our hope so that additional handling after harvest will not be necessary.

---F. W. Southwick

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NEGLECTED YOUTH

Parental neglect in the proper training of a child, according to authorities on child behavior, is a major cause of the alarming increase in juvenile delinquency. Among fruit growers failure to properly train the young fruit tree is the fundamental cause for the wayward branches and the weak character of the frame work which is altogether too common in too many orchards.

A young tree like a child must be given guidance if it is to develop into a respectable adult, physically strong and capable of assuming the burdens of adulthood. This guidance should begin after the first season's growth and every year thereafter until the complete structure of the tree has been established.

Too often the older trees which are of bearing age receive first attention with the result that time runs out before all of the pruning can be done and the youngsters suffer from neglect. The longer they are allowed to shift for themselves the more difficult it will be to develop them into self respecting members of the orchard family. How about giving these youngsters a break for a change and assure them the attention that they need before starting to prune the bearing trees?

With a good pair of pruning shears and a knowledge of the basic principles involved, the corrective pruning on a young tree can be accomplished in a couple of minutes or less if it is done every year.

These basic principles and details of pruning each type of tree fruit are contained in a new bulletin on pruning which is in the process of publication and should be available from County Agents or the Mailing Room at the University of Massachusetts within the near future.

--- O. C. Roberts

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WHY IS "PREACHING" NECESSARY?

Research and Extension workers are frequently chided about too much "preaching" on certain phases of agricultural production. In the case of Pomologists a grower may wonder why these fellows are always "preaching" about use of magnesium limestone, boron, or how to prune, or any other of the many recommended fruit growing practices? It does seem unnecessary to have to continually remind the commercial grower to do certain recommended practices in his orchard from which he gets his livelihood. However, it also seems foolish to have to continually warn the motorist about taking foolish chances when his own life may be at stake.

The author will admit that for a lot of growers the "preaching" is not necessary but there are still too many growers that are apparently failing to use certain practices considered essential for profitable fruit growing. The following are examples illustrating the point which the writer is trying to put forth.

This fall the writer saw some beautiful hand picked McIntosh apples being taken to the cider mill. The reason for these apples being marketed this way was quickly determined by cutting them open. These apples showed symptoms of boron deficiency. It was said that the apples in one block of McIntosh trees were thus affected. There are enough factors beyond the control of the grower that can cause him to lose money, without losing money by neglecting to apply borax as recommended.

Some growers failed to apply a fungicide for late season and storage scab and thereby got a lot of pin point scab. It certainly seemed a shame to have so many otherwise good apples become culls this late in the season.

A survey was conducted in 1953 in order to obtain data on the nutritional status of commercial orchards in Massachusetts. The analysis of leaf samples taken from 30 McIntosh orchards revealed that magnesium was below the desirable range in 40% of the orchards. "Calcium was below in 37.3% of the orchards followed by nitrogen and potassium with 20%." That too many of our orchards are not receiving enough magnesium lime was further evident this fall when the fertilizer programs were obtained in orchards from which leaf samples were taken. Some examples of these are the following:

- Farm A - Orchard last limed in 1945
- Farm B - Orchard last limed in 1937
- Farm C - Orchard last limed 8 or 10 years ago.
- Farm D - Orchard last limed in 1952 at the rate of one ton per acre, soil test taken this fall showed pH to be 4.7.

Another phase of orcharding that our preaching hasn't seemed to do much for is the pruning of young apple trees. In too many of our orchards the young tree is truly an orphan when it comes to pruning. In many ways it is just as important to prune the young tree as it is the bearing tree. It is from these trees that the grower will derive his future income, thereby, it is important to develop a strong framework that will support the bearing portions of the mature tree in later years. A little corrective pruning on the young trees is a sound investment.

The various topics presented in this article partly illustrate why it is necessary to continually stress basic cultural practices so essential for a profitable fruit-growing enterprise.

— W. J. Lord

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A MITE-Y SUGGESTION

When you go fishing, you get more of the kind you want if you know fish and their habits.

Even I know you hunt squirrels in trees and rabbits on the ground, ruffed grouse in woods and pheasants in fields.

But do you remember some of the important differences between the mites on your apple trees? Here's a chance to review them.

You'll do better at fighting mites -- and save money too -- when you go at the job with more "what, where and why" answers to guide you.

I think the following chart will help you to know and to "get" the mites you are after.

Hey, Mite -- Who Are You?

	'European 'Red '	'Clover 'Mite '	'Garman Spider 'Mite (Yellow 'Mite)	'Two-spotted 'Mite '
Winter stage	'eggs - dull red '	'eggs - shiny 'red '	'adults - yellow '	'adults - dull 'orange or pink '
Where found in winter	'spurs, twigs, 'branches '	'trunk, stones, 'vegetation '	'under loose 'bark '	'Under debris on 'ground (loose bark) '
Hatching per- iod or be- come active	'Pink thru 'Bloom '	'Silver-tip thru 'Delayed Dormant '	'very late Delayed 'Dormant to 'early Pink '	'on ground cover- 'Silver-tip to 'Green-tip '
First eggs laid by overwintering adults			'About Pink '	'About early Del. 'Dormant on grass 'and weeds '
First adults mature and lay eggs	'About Petal- 'Fall or soon after '	'Soon after 'Bloom '	'--- '	'--- '
Where summer eggs are laid	'upper and lower 'leaf surfaces all 'over trees '	'on bark of spurs 'twigs, branches 'and trunks '	'undersides of 'leaves '	'undersides of 'leaves - grass 'and weeds first; 'later in trees '
Egg color	'dull red '	'shiny red '	'pearly white '	'pearly white to 'slight amber '
Number of generations	'7 - 8 '	'5 - 6(?) '	'4 - 6(?) '	'9 - 11 '
Identifying features of adults (summer)	'brick-red, back 'rounded, light- 'colored spots 'and hairs, legs 'of equal length '	'brownish-red, 'back flattened, 'front legs much 'longer than 'others '	'pale yellow or 'lemon yellow, 'dark spots 'scattered, body 'elongate oval '	'pale yellow or 'greenish yellow, 'two large dark 'spots, body oval '
Activity of adults and young	'move about, on 'both surfaces 'of leaves '	'return to bark 'to shed skins 'and lay eggs '	'among hairs on 'undersides of 'leaves '	'among hairs on 'undersides of 'leaves, webbing '
Characteris- tic damage to leaves	'general over-all 'dulling of green 'color and final- 'ly a bronzed 'effect ' ' '	'a quick yellow- 'ing, usually on '1 or 2 branches 'at first (look 'for white, empty 'skins on spurs) '	'spur leaves crin- 'kled, mottled 'yellow and brown; 'later lvs. cupped 'from below, yel- 'lowed above along 'veins, greyish 'below '	'similar to Yellow 'mite, appears 'later, general 'yellowing follows, 'seen first on 'inside and low- 'hanging branches, 'in July or later '

---E. H. Wheeler

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POMOLOGICAL RESEARCH

9. The Influence of Chemical Treatments on Flowering, Fruiting, and Preharvest Drop of Fruit Trees

Many apple and peach varieties tend to set an excessive number of fruits when they blossom heavily provided that the weather at blossom time is not a factor in reducing the set. Unless the leaf area per fruit is increased in such years the fruit size at harvest is apt to be so small that much of the crop cannot be marketed at a profit. Also, if removal of excess fruits can be accomplished shortly after the trees bloom (before flower bud initiation commences) it may be possible to "break" the biennial bearing habit of many of our apple varieties. Hard thinning of apples is a long, expensive operation which is usually done too late in the summer to obtain the maximum size benefits for a given degree of thinning or to "break" the biennial bearing habit of the trees. It was our hope in working on this project to find certain chemicals which could be sprayed on the trees early enough to reduce the set, improve size of the remaining fruit, and make many of our alternating varieties more annual in production.

In addition, this project is concerned with the testing of chemicals which may be suitable for preharvest drop control of apples. All growers are aware that our principal variety, McIntosh, may drop much of its crop just before harvest. We have been interested not only in measuring their drop control effectiveness but also in determining their influence on fruit ripening and storage life.

For several years now we have been testing several growth regulating substances for thinning apples and peaches. For apples the materials naphthaleneacetic acid (NAA) and naphthaleneacetamide (NA Amide) have been found to be of considerable value in thinning many apple varieties and improving the size of remaining fruit. Also, when thinning is sufficiently heavy, the weather favorable, and the variety not too inherently biennial, regular bearing has frequently resulted from spray applications of these materials applied at late bloom or up to a couple of weeks thereafter, depending on the variety.

One of the early problems, encountered when NAA was the principle material used for this purpose, was occasional overthinning and severe foliage injury on certain varieties. The use of NA Amide has greatly reduced these risks. However, we haven't reached the point where the degree of thinning obtained by chemical means can be precisely predicted in advance. Even though chemical thinning of apples lacks the precision desired, it has now reached the point where it is a rather common commercial practice. The situation with peaches is still in the experimental stage. Neither NAA nor NA Amide are reliable materials for peach thinning but Chloro IPC has shown some promise.

In recent years the number of chemicals available for preharvest drop control of apples has increased. The principal materials now being used are NAA, 2,4,5-trichlorophenoxyacetic acid (2,4,5-TA), and 2,4,5-trichlorophenoxypropionic acid (2,4,5-TP). NAA materials were first found useful for this purpose about 15 years ago. In the last 5 years 2,4,5-TP and 2,4,5-TA, to some degree have replaced NAA since they usually control drop for a longer period than NAA.

However, 2,4,5-TP often hastens fruit ripening to a much greater degree than NAA when applied to McIntosh and/or varieties that mature ahead of it. Also, 2,4,5-TA failed to control McIntosh drop in 1955 when both NAA and 2,4,5-TP were reasonably effective. Because of the failure of 2,4,5-TA to control McIntosh drop in 1955 there is still a need for a material which will control drop for 3 to 4 weeks but which will not hasten ripening appreciably.

--- F. W. Southwick

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SAFETY IN THE WOODS

Felling Trees

Felling and skidding trees is relatively dangerous, requiring some degree of skill and knowledge of safe methods. The danger is increased because of the remoteness of the operation, the lack of ready help in case of accident, and the time required for medical attendance. Woodsmen can, to some extent, govern the direction of fall. This is determined by the natural lean of the tree, by the position of obstacles as other trees, rocks, stumps, and electric wires, and by the proximity of farm buildings.

After the direction of fall has been determined, a wedge-shaped notch or undercut is made on that side of the trunk just above the swell of the roots. This will guide the tree in falling and will prevent splitting of the hole before it is completely severed from the stump.

Workmen should stand where it is comfortable and near enough to their work so that they will not strike a glancing blow. Standing back of or running from falling trees is dangerous. The workmen should step several feet to one side and watch the direction of the fall.

Most wood accidents are due to carelessness. The following suggestions should be carefully observed:

1. Never chop or saw without making sure you have a clear circle in which to swing the axe or pull the saw. Remove all vines, branches, and brush that are within range. One should look overhead for branches that may catch or deflect the axe.
2. Be sure other workmen are not in range of your axe swing. After being sure of swinging space keep your eye on the mark. Do not crowd your work.
3. In chopping keep a solid grip with the hand uppermost on the handle.
4. Avoid chopping into knots. Swing the axe away from body and legs. A glancing axe is dangerous.
5. Never leave the axe lying on the ground. When not in use drive the blade into a log or stump.
6. If you fall, throw the axe from you as quickly and as far as you can.

7. Never carry a double-bitted axe on your shoulder in rough country. Grasp the handle close to the head with the bit at right angles to the ground.
8. Never carry a saw under the arm, carry it balanced on the shoulder with the teeth pointing outward.
9. When axe and saw are not in use, or when carrying them to and from the job, fasten a piece of split fire hose over the bits and teeth as a guard.
10. Warn other workmen of falling trees by calling "Timber-r-r-r!"
11. Stand a safe distance away from a falling tree. Never stand directly behind as it may "kick back" over the newly made stump,
12. Use extreme caution in felling a rotten tree. It is difficult to tell just when or in what direction the tree will fall.
13. When felling a tree having some dead limbs or a spike (dead) top, keep watch for the falling of these "widow-makers".

--- R. B. Parmenter

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VIRUS-FREE STRAWBERRY PLANTS FOR 1956.

In most cases where virus-free strawberry plants have been compared with ordinary plants of the same variety the virus-free stock have been superior. In some cases the difference has been slight and in other cases the virus-free plants have showed marked superiority. Since virus-free strawberry plants cost little or no more than ordinary stock of plants, it would seem wise for the grower to obtain virus-free plants wherever possible.

A recent release from the U.S. Department of Agriculture at Beltsville, Maryland, gives the latest information on the availability of virus-free planting stock and the following is taken from that release:

1. At present 28 varieties are available from nurseries for planting by growers. Of these the following appear to be of most interest to Massachusetts growers:

Armora	Dixieland	Pocahontas
Aroma	Fairfax	Redstar
Blakemore	Howard 17 (<u>Premier</u>)	Robinson
Catskill	Midland	Sparkle (<u>Paymaster</u>)
	Vermilion	

2. There are 11 varieties of which no virus-free stock is as yet available to nurserymen. Of these the varieties most likely to be of interest to Massachusetts growers are Aberdeen, Fairland, "Old Premier", Streamliner, Temple.

3. The varieties Eden, Empire and Gem (=Superfection, Brilliant) are being propagated in virus-free condition by nurseries but are not yet available in sufficient supply to allow sale to growers.

4. Sometimes virus-infected strawberry plants can be freed of virus by a special heat treatment. However, it sometimes takes a year or two to make sure that the heat-treated plant is actually free of virus, and that the virus is not merely latent and will reappear. At the Research Station at Beltsville single plants of seven varieties have been apparently freed of virus by this heat treatment. Those most likely to be of interest to Massachusetts growers are Fairland, Streamliner, Temple and Twentieth Century.

5. For nurserymen who have space available in their screenhouse and want a few strawberry plants for foundation stock, the following varieties are available: Eden, Empire, Gem and Orland.

Neither the U.S. Department of Agriculture nor the State Experiment Station has a supply of virus-free plants for sale. A list of nurseries offering virus-free strawberry plants will be supplied on request.

--- J. S. Bailey

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FARM FAMILIES AND SOCIAL SECURITY

Basically the Old Age and Survivors Insurance program is a family group insurance plan operated by the Federal Government. Self-employed persons like farm operators, hired workers and their employees pay "premiums" for this insurance while they are earning income. Social Security should be considered only as a part of a family's plan for adequate insurance protection and retirement income.

Kinds and Amounts of Benefits

Three kinds of benefits are provided under the program; one, monthly retirement payments to insured persons and dependents; two, monthly survivor's payments to the families of deceased insured persons and three, lump sum payments of from \$90 to \$255 on the death of an insured person.

Is Participation In The Program Voluntary?

No, if you qualify, it is required that all self-employed persons, including farmers and hired farm workers whose earnings are such as to come within the provisions of the law must report earnings and pay Social Security taxes regardless of age.

Farm Operators as Self-Employed Persons

Persons farming for themselves as owner-operators, partners participating in a joint venture, or as tenants or share farmers who make a net profit from farming of \$400 or more per year, must pay the Social Security tax and are entitled to the benefits. Farmers who operate entirely with hired help are considered self-employed persons.

Farm Workers

Hired farm workers including household help who are paid as much as \$100 cash wages in one year from any one farmer employer whether work is regular or not, are included as of January 1, 1955.

Farm Work Not Covered

1. Work by employer's son or daughter under age 21 or by the employer's father, mother, wife or husband.
2. Work by foreign workers lawfully admitted from British West Indies or by Mexican contract labor.
3. Work in connection with gum naval stores.

Rental Income Excluded

Share or cash rental income is excluded by law from income classed as net earnings from self-employment.

How Are Benefits Earned?

Farmers and farm workers become entitled to benefits by earning enough income over a period of time from operating a farm or from cash wages in farming or other covered occupations under the law.

When Do Farmers and Farm Workers Become Insured?

Certain lengths of time in covered work are necessary to qualify for Social Security benefits. The time varies with the type of benefits, whether survivors or retirement and the date a person reaches age 65 or dies. The amount of work required is figured in quarters of coverage which are calendar quarters. It may be as little as one and a half years or as much as ten years, depending upon the age of the worker. Farmers who were 65 before July 1, 1954 can qualify in one and a half years or six quarters.

How Do Insured Persons Become Eligible for Retirement Benefits?

Farmers and farm workers become eligible when they meet all of the following conditions:

1. Fully insured status
2. Sixty-five years of age or older
3. Retired
4. Application for payments has been made

A retired worker between 65 and 72 years of age can earn up to \$1200 in cash wages or from self-employment and still draw all of his retirement payments.

What Account Numbers and Other Records Are Needed?

Everyone who comes under the program needs a Social Security Account Number card. The number on the card is used to identify the Social Security Account of the worker. Duplicate cards can be secured if the originals have been lost. A farmer who hires workers covered by the program needs an Employer's Identification Number in addition to his own Social Security card. Good farm records which show clearly the amounts paid to workers and the amounts earned in self-employment are needed. No particular form of record is specified provided it shows the amounts paid or earned and by whom and during what time.

What About Farmers' sons or daughters?

Farmers' sons or daughters who carry on special activity all by themselves such as 4-H or FFA projects and who have net earnings of \$400 or more are covered. They must file reports and pay Social Security Taxes regardless of age.

--- L. D. Rhoades

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POMOLOGICAL PARAGRAPHS

Root Crowding

Apple roots may extend several feet beyond the tips of the branches. If the tops of the filler trees are crowding those of permanent trees, what's happening in the soil under the trees? Most likely the roots of the permanent and filler trees are interlaced. This will lead to competition for water and nutrients.

Prevention of root crowding is another argument for timely removal of filler trees.

Power versus Hand Pruning

A recent study made at the University of Connecticut of power versus hand pruning showed that an average of 660 pruning cuts / tree were made with power pruners as compared to 600 cuts / tree with hand tools. An experienced worker pruned 21 trees in an eight hour day with power pruners and 18 trees/eight hour day with hand tools.

Two Phases of Pruning

Pruning can be divided into two phases: decision and cutting. The time spent in the decision phase of pruning cannot be shortened by modern equipment. This phase depends upon the man doing the pruning. The ability to "size up" each tree and to arrive at a quick but sound pruning decisions is reflected in the number of trees pruned in a day.

On older trees, that may need some large limbs removed, it might be worth the orchard owner's time to paint these limbs so that when it comes time to prune the decision phase has been eliminated.

--- Editor

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

FEBRUARY 15, 1956

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Connected chiefly with fruit growers' problems, other than pest control, and is somewhat involved in research. Editor of FRUIT NOTES.

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Contributors to This Issue from Supporting Fields

E. H. Wheeler - Extension Entomologist

NOTICE

An all day session for Fruit Growers operating roadside stands is being arranged for Tuesday, February 28, 1956, at the College of Agriculture, Storrs, Connecticut, by John Chandler of the New York, New England Apple Institute. Sixty people attended the lively meeting a year ago and it was observed that the meeting was worth several thousands of dollars to every grower attending. All Fruit Growers operating stands are welcome!

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PRUNING CULTIVATED BLUEBERRIES

Pruning is one of the most important operations in the successful production of large crops of highbush blueberries.

The basic principles underlying the pruning of this crop are no different than those for other fruits. It is only the mechanics that differ.

All the operations in fruit growing are aimed at producing more or better fruit, or both. If the idea of "better" is limited by substituting the idea "larger", it is seldom possible to obtain both objectives, that is to increase both crop size and fruit size. It has been shown repeatedly for other fruits, such as apples and peaches, that maximum crop size, or number of fruits, is obtained at the expense of fruit size. Or conversely, that large fruit size can be obtained only by reducing the number of fruits, that is crop size. Highbush blueberries are no different in this respect. The following statement is from a bulletin issued by the Michigan Experiment Station in 1944: "---the more severe the pruning given a mature highbush blueberry plant the greater the reduction in yield, the larger the berries produced, and the earlier the maturity of the berries."

There is the basic choice: light pruning to obtain maximum crop and late maturity, or heavy pruning to obtain maximum size and early maturity. Each grower will have to decide which best suits his own particular conditions or whether some compromise is desirable. However, be warned against going to extremes in either direction. It doesn't follow that if little pruning will produce big crops, no pruning will produce bigger. It may for a year or two but the end result will be bushes weakened by over cropping, producing small crops of very small berries. On the other hand, it is possible to overdo the pruning and cut out so much bush that the crop is cut unnecessarily with no compensating increase in size. After all, the maximum size of blueberries, as well as any other fruit, is set by heredity. After this maximum is reached no amount of pruning, fertilizing, or any other practice will increase size further. In my opinion very few Massachusetts blueberry growers are over-pruning but many are pruning too little.

Now comes the much more difficult and controversial part of pruning, what to cut out and how to go about it. To do a good job of pruning requires both good judgement and skill. Frequently, much more time is used deciding what to cut than it takes to do the cutting. This demonstrates the necessity for the training of judgement. No one can learn to do a good job of pruning by reading a book or watching someone else. These are helpful, especially watching someone with experience who will take the time to explain why each cut is made. This is

only a start. Each worker must develop his own judgement by taking the pruning shears in his own hands and deciding which branch stays and which is cut. Then the results should be studied. How else can one decide whether the pruning job was a good one? Study the bushes when the fruit is ripe. This tells the story. The fact that the bush "looks good" when the pruning is completed may be deceiving. Well trained help that can be depended on year after year is a great asset.

In New Jersey the blueberry holdings are often large enough so that the cost of pruning and the time required are very considerable. For this reason Professor C. A. Doehlert has made a special study of pruning. At a recent meeting of the Massachusetts Cultivated Blueberry Association he demonstrated four basic methods of pruning blueberries. The first involves a very detailed cutting of individual shoots and branches with a hand shears. It usually results in the highest yields but is slow and costly. Returns were lowest of the four methods. The second is also a hand shear method. Groups of branches are cut; that is large stems with much weak wood. Fewer cuts are made, more bushes can be pruned per man day, cost per acre is reduced. In the third and fourth all the pruning is done with long-handled lopping shears. This is the fastest and cheapest way because only a few large cuts are made on each bush. In the third method the cuts are made in the top of the bush. Groups of branches are removed as in the second hand shear method. Pruning with the lopping shears could be done a little faster than with hand shears. It would be easier to do too much. By the fourth method large old stems are cut at the base of the bush. This is not much faster than the third method and overpruning is much more likely to result. This method is not for the inexperienced. Some of the results obtained by Professor Doehlert are given in the following table. The Rancocas bushes were in a field lightly pruned in preceding years; the Jersey in a heavily pruned field.

	Hand Shear				Loppers			
	Detailed		Groups		Top		Base	
	Rancocas	Jersey	Ran.	Jer.	Ran.	Jer.	Ran.	Jer.
Time to prune, min.	4.6	5.2	1.6	2.5	0.7	2.0	0.7	1.5
Cost per acre	\$136.	\$150.	\$45.	\$75.	\$22.	\$60.	\$22.	\$45.
Pints per bush 1955	6.6	8.1	8.3	8.6	9.0	8.4	10	7.1
Returns per bush	\$1.58	\$2.11	\$1.84	\$2.24	\$2.00	\$2.23	\$2.16	\$1.83

Some of the growers at the meeting expressed a preference for a combination of methods. They like to take out a few large, old stems at the base with lopping shears and then finish the top with hand shears. This combination has special merit where a pruning crew of varying skill is used. The best man or two can go ahead with loppers and make the big cuts. The less experienced follow with hand shears. Wrong cuts made with hand shears are less damaging to the bush.

Pruning is a very important operation in successful blueberry growing. It involves the selection of a definite objective. To obtain this objective requires knowledge, skill, and judgement. There are several ways in which the pruning can be done. The method selected will depend largely on the training and experience of the worker. Pruning is still more of an art than a science.

---J. S. Bailey

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A SAFETY QUICKIE

"When chemicals (pesticides) cause undersirable effects, I find one or more of the following has made the result possible:

1. Ignorance of the dangers involved.
2. Faulty skills or equipment.
3. A careless attitude.

The human factor which arises from such attitudes as bravado, a desire to remove safeguards and to take timesaving shortcuts, a belief that 'it can't happen to me,' sheer ignorance, and stubbornness is recurringly apparent in the circumstances of the misuse of chemicals.

The resulting damage may be to useful crops, to farm animals, or to human beings."

- by Dr. Lemuel C. McGee, National Agricultural Chemicals
Medical Committee

---E. H. Wheeler

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LET'S TURN ON THE LIGHT

At the present time fruit growers in Massachusetts are groping in the dark trying to determine future trends in the industry. In order to look into the future we need more light on the situation as it is today. How many bearing trees of the important varieties are there in commercial orchards? How many young trees have been planted? To what extent are new plantings replacing old trees that are going out of production? What will be the potential production within the next ten years compared with that of today? Is the McIntosh Variety over planted?

In order to answer these and many other questions for which there is no accurate information available, the Fruit Industry Committee of the Massachusetts Fruit Growers' Association has adopted a tree fruit survey as its major project. The Extension Service at the University is prepared to render all possible assistance in carrying out this project. The actual survey will be conducted next June or July. At that time each fruit grower in the State with 100 trees or more will be asked to fill out a questionnaire. This questionnaire is included in this issue of "Fruit Notes" in order that you may become familiar with it and possibly have the information ready when the actual survey is conducted.

The full cooperation of everyone will be necessary to accomplish this objective.

May we count on you to help turn on the light?

--- O. C. Roberts

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MASSACHUSETTS APPLE, PEACH AND PEAR SURVEY

County _____ Town _____

Name _____ Mail Address _____

Principal Farm Enterprise _____

Tree Fruits (acres): Apple _____, Peach _____, Pear _____, Total Acres (tree fruits) _____

Small Fruits (acres): Strawberries _____, Raspberries _____, Grapes _____,
Cultivated Blueberries _____, Total Acres (small fruits) _____

If all or any part of apple orchard has been abandoned since 1940, indicate acres _____

Reason _____

Apples (Number trees now in orchard exclusive of abandoned trees)

Variety	4 yrs. & under	5-9 yrs.	10-14 yrs.	15-19 yrs.	20-29 yrs.	30 yrs. & over	1955 Yield (bushels)**
Baldwin							
Cortland							
Early McIntosh							
Golden Delicious							
*Gravenstein							
McIntosh							
*Northern Spy							
*Red Delicious							
*Rome or Gallia							
Wealthy							
All other varieties							
Totals							

New Varieties	(number of trees)		New Varieties	(number of trees)	
	4 yrs. & under	5 yrs. & over		4 yrs. & under	5 yrs. & over
Davey			Monroe		
Idared			Puritan		
Melrose			Spartan		

Capacity of Refrigerated Storage _____ bushels.

Per cent of apple crop sold: Roadside Stand or Farm Sales Room: Own _____%; Other Stands _____%
Direct to retail stores _____%; Other selling agent _____%; Used or sold for cider _____%.

*Including sports. **Include saleable drops and cider apples.

Peaches (number trees in orchard)

Variety	4 yrs. & under	5-9 yrs.	10-14 yrs.	15-19 yrs.	20 yrs. & over	1955 Yield (bushels) *
Early Elberta						
Elberta						
Golden Jubilee						
Halehaven						
J. H. Hale						
Red Haven						
Summercrest						
Your other important varieties						
1.						
2.						
3.						
4.						
5.						
All other varieties						
Totals						

Pears (number trees in orchard)

Variety	4 yrs. & Under	5-9 yrs.	10-14 yrs.	15-19 yrs.	20-29 yrs.	30 yrs. & over	1955 Yield (bushels) *
Clapp's Favorite							
Bartlett							
Bosc							
Seckel							
Your other important varieties							
1.							
2.							
All other varieties							
Totals							

* Include saleable drops.

Explanation of Fruit Survey Questionnaire

Size of Farm: Only farms with 100 trees or more will be included in this survey.

Principal Farm Enterprise: What is the chief source of income on the farm? Is it fruit growing, dairying, poultry raising, or some other activity?

Acres Apple, Peach, Pear, etc.: Under this heading total acreage in each fruit listed is desired. Omit fruits grown for home use only. Only acreage of cultivated blueberries grown for sale should be recorded.

Age of Trees: Under the heading the number of trees of different ages now growing is desired. Varieties which are sports such as Starking, should be recorded with the parent variety, as Red Delicious. Include trees planted in 1956.

Quantity Harvested: 1955 yield refers to all marketable fruit harvested in 1955 including saleable drops and cider apples. Give quantity harvested by varieties, if possible. In any case be sure to record the total. Note that peaches are to be reported in bushels, rather than baskets.

Abandoned Orchards: This applies to apple orchards only. An abandoned orchard is one which is not sprayed. In addition to giving the acreage it is particularly important to record the reasons for abandonment.

New Varieties: If any of the new varieties listed are planted in your orchard, indicate number of trees in appropriate column.

Refrigerated Storage: Only mechanically refrigerated storages should be included under this heading.

Method of Sale: Note that percentage of the apple crop and not number of bushels is wanted. Total of all methods should equal 100 percent.

a. Sales Direct to Consumers: Any sales made to consumers at the farm, whether from a definite sales area or not, should be recorded as "own". After "other-stands" indicate per cent of crop sold to other roadside stand operators, if any.

b. Direct to Retail Stores: Record per cent of crop you deliver direct to retail stores, if any.

c. Other Selling Agent: Under this heading record per cent of crop sold thru a cooperative, to a wholesaler, on commission, by mail order, etc.

d. Used or Sold for Cider: Indicate per cent of crop which you made into cider in your own mill or sold to be made into cider by others.

Peaches and Pears: Under "Your other important Varieties" list any varieties which you have planted for commercial production which have not been indicated specifically above.

General Directions: To facilitate tabulation give information desired in spaces provided wherever possible. Leave other spaces blank. If orchard extends into adjoining state record data only on that part which is located in Massachusetts.

SEASON OF RED RASPBERRY VARIETIES

One of the important characteristics of any fruit variety is its season of harvest.

With any fruit which ripens over an extended period the meaning of early, mid-season or late is not readily apparent.

In order to obtain a numerical expression of time of ripening for the varieties under test we have divided the entire picking season for all varieties into thirds. Then for each variety the percentage of its crop harvested in the first and last third of the season has been determined. This information is recorded in the following table for the years 1953 through 1955.

Season of Harvest - 1953-1955.

Variety	% early	% late	Season	Remarks
1. Tweed	86.8	0	Very early	1953 only
2. Gatineau	72.3	3.2	Very early	
3. Durham	68.5	1.8	Early	1953 only
4. Sunrise	64.6	5.7	Early	
5. Antietam	61.8	4.6	Early	1954-5
6. September	56.0	14.1	Early	
7. Madawaska	55.9	11.5	Early	
8. Chief	40.7	11.2	Early-midseason	
9. Early Red	38.4	20.5	Early-midseason	1955 only
10. Willamette	33.0	13.9	Midseason	Badly winter killed in 1955
11. Viking	27.0	19.7	Midseason	Badly winter killed in 1955
12. Cuthbert	18.4	15.4	Midseason	1954-5
13. Latham	18.1	24.3	Midseason	
14. Milton	1.2	44.7	Late	1954-5
15. Amber	0	47.7	Late	Badly winter killed in 1955

The summer crops only of September and Durham are represented in the figures for the two everbearers. The severity of winter injury on Willamette, Viking and Amber in 1955 may have delayed their season of ripening for that year.

During the period 1953-55 Gatineau, September, Madawaska, Latham and possibly Milton have been the most dependable varieties under trial. Tweed and Antietam have been discarded because of their small and poor quality fruit. Durham cannot compete with other varieties in the early summer season, yet it is the earliest in fall crop. Willamette has an excellent fruit but winter killing makes it unreliable for any but the gambler.

For latest information on varieties recommended for planting in Massachusetts consult Special Circular 212-F, revised January 1956, and available from the Mailing Room, University of Massachusetts, or the Pomology Department.

—A. P. French

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STRAWBERRY VARIETY TRIALS - 1955

The following table lists, in order of earliness, several of the strawberry varieties which were fruited in the University variety trials last summer.

Season of Ripening and Yield

Variety	% Early	% Late	General Classification	Calc. Yield Quarts per Acre
Pathfinder	29.8	7.4	Early	7022
Howard 17	29.3	8.3	"	7089
Howard V. F.	22.4	15.0	"	7560
Temple	20.2	11.5	"	6530
Catskill	14.8	16.2	Midseason	8927
Catskill V.F.	6.6	19.4	"	14044
Stelemaster	14.7	16.3	"	5639
Pocahontas	12.3	10.8	"	9496
Vermilion	9.4	14.3	"	10242
Robinson	8.7	19.4	"	6137
Robinson V.F.	4.5	22.1	"	7037
Redcrop	7.5	11.8	"	6321
Sparkle	5.9	34.4	Late	11490
Sparkle V.F.	3.4	39.5	"	14013
Orland	5.4	21.2	Midseason	12876
Dixieland	4.8	20.0	"	9327
Aberdeen	2.2	33.8	Late	6990
Armored	1.1	39.2	"	9910
Monmouth	0.7	30.9	"	9157
Maine 55	0.6	19.6	Midseason	9864
Blaze	0.2	35.7	Late	14627

Thirteen pickings were made during the season. The "% early" column indicates the percentage of the total crop of each variety which was harvested during the first four pickings, June 6 through 13. Likewise, the "% late" column covers the last four pickings, June 27 through July 5.

This procedure lets us see just how much of the crop of each variety was harvested in the first, middle or last third of the season and thereby provides data by which to classify a variety as early, midseason, or late. It is interesting to note, in all four cases where virus-free stock is compared with ordinary stock of the same variety, that fruit on virus-free plants ripened slightly later than on ordinary plants.

The calculated yields per acre are based on data from small single row plots. For every variety there were at least two such plots scattered throughout the field whereas for Howard, Catskill, Vermilion, Robinson, Redcrop, Sparkle and Armored there were three or four such plots. Red stele was somewhat in evidence in the Howard and Robinson plots, both ordinary and virus-free, which doubtless influenced the yield of those plots. However, the figures for Catskill, Vermilion, Redcrop, Sparkle and Armored are probably representative of their production capacities in this test. The yields of virus-free Catskill and Sparkle

give rather substantial evidence of the superiority of virus-free plants to ordinary plants of those varieties obtained from good reliable Massachusetts strawberry nurserymen.

Among the newer varieties Stelemaster is worth considering only on land where Sparkle or other varieties resistant to the common strain of red stele have become infected by another strain of red stele. Redcrop has never been a satisfactory yielder with us. The fruit of Pocahontas is extremely variable in size and of doubtful usefulness in this area. Dixieland is an extremely firm variety characteristic of those grown in the deep south, but much too sour for our market. Armored is a rather coarse berry but excellent quality. The plant is vigorous but not resistant to red stele. Blaze is as bright as the name indicates and is well worth testing as a late variety, but is not resistant to red stele. The three varieties, Orland, Monmouth, and Maine 55, are all resistant to the common strain of red stele. All three are a bit soft but have rather attractive berries of good size.

---A. P. French

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MORE SUGGESTIONS ON MITES

In the preceding issue of FRUIT NOTES I suggested the importance of knowing which mite or mites you had to do battle against. Now let's take a closer look at our "ammunition" and when it can be used most effectively.

On the following pages you will find charts giving a wide choice of materials and timing. Some materials or combinations of materials and timing have certain advantages. These vary from orchard to orchard according to kinds of mites present, apple varieties, other materials being used, need to control other pests and many other factors. It is impossible for an "expert" to say, "This is the best material for mite control program." What is right for you may be quite otherwise for your neighbor. There may be advantages in using split programs - one material in one of three applications and quite a different material in one or both of the others,

No program should be selected finally until relative costs have been worked out. Actual cost of the material used in 100 gallons times the probable (recommended) number of applications required will give you a base figure for direct comparison. Base figures should be scaled up or down according to other factors such as necessity for use in a special application and effect upon other pests needing control.

Safety for the spray operators, compatibility with other materials, possible russetting or other injury on susceptible varieties, adaptability at concentrations used in your machine, effect upon beneficial insects and mites, and possible residue complications at harvest are other important considerations.

Good apple growers want to obtain outstanding control of mites as well as other pests; they cannot afford anything less. Most successful growers carefully consider all relevant factors in selecting their materials. They get the "mostest" for the "leastest" without sacrificing quality or yield.

Is there any other way to play this game?

---E. H. Wheeler

malathion

25% WP 2 lbs.

1. Pink
2. Calyx or I Cover
3. II Cover
(Calyx, I or II and III
Cover sequence is second
choice.)

- (1) controls Red, Yellow and Clover Mites for season; kills other insects hit by spray, including bud moth; some residual effect; prevents extensive losses from rosy aphid; checks other aphids; non hazardous to apply; substitute for DDT or lead in pink.
- (2) may increase injury from captan on captan-susceptible varieties; resistant strains may develop; little effect on 2-Spot at this time; avoid use with mercury.

Oil - "Superior" type
tank-mixed - 2 gals.
commercial - 2 1/2 gals.

1. Delayed Dormant
(Dormant if using captan
in early scab sprays.)

- (1) about a 50-50 chance of complete control of Red Mite for season; delays and may prevent resistant strain development; checks San Jose Scale; gets machine ready for scab sprays; can be combined with 1st scab spray and rosy aphid control; controls Clover Mite; good "kick-off" for glyodin.
- (2) poor weather and ground conditions; special applications unless scab and aphid control materials needed and included; not 100% certain to give control for season; best used dilute or 2X; little or no effect on Yellow or 2-Spotted Mite

over

50% WP 1/2 lb. in
Pink & Calyx;
1/2 lb. later

1. Pink
2. Calyx
3. II Cover
4. IV Cover
(may be used in later
sprays up to August 1
except on early varieties)

- (1) controls Red, Clover and Yellow Mites for season; some effect on 2-Spot; more effect if continued one or two sprays; compatible; not hazardous to handle; kills eggs and young active stages.
- (2) no effect upon any other pests; over spraying and higher concentrations may cause some russetting and foliage injury.

parathion

15% WP 1 1/2 lbs.
(plus carbon on
McIntosh and relatives)

Same as above under
malathion.

- (1) same as above under malathion but slightly longer residual effect; excellent against bud moth; some effect on curculio.
- (2) HAZARDOUS; injury to Macs and related varieties; safened by carbon; resistant strains may develop; may increase injury from captan; little effect on 2-Spot.

TEPP

40% 1/2 pint
20% 1/2 pint
(use reduced dosages
in concentrates.)

Same as above under
malathion.

- (1) gives control of Red, Yellow and Clover Mites for season; kills other insects hit by spray; prevents extensive losses from rosy aphid; checks other aphids.
- (2) HAZARDOUS to Handle; no residual effect; compatible with glyodin and mercury; little effect upon 2-Spotted Mite; resistant strains may develop.

Alphabetical List
of MATERIALS AND
AMOUNTS per 100 (dilute)

WHEN and HOW
MANY TIMES

(1) What's GOOD and (2) What's NOT so GOOD
and OTHER RELEVANT REMARKS

A. EUROPEAN RED MITE (B. 2-Spotted Mite - see next issue)

(Either ~~Yellow~~ or Clover White or both controlled by many programs; 2-Spotted Mite checked a little by some.)

Aramite

15% WP 1½ lbs.)

(WP = wettable powder)

(Not recommended in
sprays applied before
mid-June.)

- (1) safe to apply; compatible; considerable residual effect;
better against 2-Spotted Mite; protects beneficial forms.
(2) slow acting; loses value rapidly in rainy, humid weather;
no effect upon other insects.

Chlorobenzilate

25% WP 1½ lbs.

(For extensive
trials)
1. Pink
2. Calyx or I Cover
3. II Cover
(also in a series of 2
or 3 summer applications)

- (1) controls Red, Clover and Yellow Mites for season; little
effect on 2-Spot at this time; not hazardous to handle.
(2) no effect upon other pests; a lack of grower experience
at present; full effect of over spraying and high concen-
trations not known; all compatibilities not known.

demeton 5/10/59 in Pink or Calyx
21% EC 6-8 oz.

(For extensive
trials)

(EC = emulsifiable
concentrate)

Pink
(also in I or II Cover if
mites or aphids are found)
(also useful in I or 2 ap-
plications near end of June
or before mid-July.)

- (1) a systemic; easy on beneficial types; should control Red,
Yellow and Clover Mites for season and check 2-Spotted Mite
some; should kill all aphids present; appears compatible.
(2) HAZARDOUS to Handle; lack of grower experience; no control
of other insects except possibly as hit by spray; full pic-
ture on russetting, foliage injury is not known but appears
O.K.

EPN-300

25% WP 1 lb.

1. Pink
2. Calyx or I Cover
3. II Cover
(Calyx, I or II and III
Cover sequence is second
choice.)

- (1) same as below under malathion but longer residual effect;
some effect on curculio; HANDLE CAREFULLY.
(2) cannot be used on McIntosh and related varieties; otherwise
like malathion except HAZARDOUS.

Genite 923

50% EC 1½ pints

(For limited
trials)

Pink only
(Do not try it after
bloom.)

- (1) excellent against Red Mite; not hazardous to handle.
(2) no effect upon other pests; lack of grower experience
at present; effect on Yellow and Clover Mites not known;
all compatibilities not known; result of using higher
concentrations not fully known.

PRUNING PEACH TREES

Pruning At Setting Time

Even though the life of a peach tree is normally considerably shorter than that of an apple tree, the same care should be taken in building a strong framework to prevent subsequent breakage of main scaffold limbs.

In the past, the customary method of training a young peach tree has been the open center system which consists of three or four main scaffold limbs arising at approximately the same point on the trunk. This tends to produce a tree with weak crotches which frequently break down with a heavy load of fruit. The recent trend is towards a modified leader type of tree. Normally a one-year peach tree as it comes from the nursery has several side branches. After the tree is set, all branches within eighteen inches of the ground should be removed. Any narrow angled side branches should be removed. Then, three or four branches which come out at a wide angle, vertically spaced about six inches apart, should be saved for main scaffold branches. All other branches should be cut off flush with the trunk. The leader should be cut back to the top-most side branch and then the lateral branches should be cut to short stubs two to four inches long, with each containing one bud.

If one-year trees, 9/16 - 11/16 inch diameter, and five to seven feet in height are set, an alternative method, known as deshooting may be employed. This provides for a better selection of lateral branches and a somewhat better establishment of the head. With this method, the main trunk is cut off at forty to forty-four inches from the ground and all branches are removed below eighteen inches from the ground. All other side branches are cut back to stubs of one bud each. Later, when the shoots from these buds have grown to a length of four to eight inches, four or five of the most desirably placed laterals are selected and the others removed. A vertical spacing of four to eight inches is desirable; also, the laterals should be spaced around the trunk so each has an open space in which to develop. The more vigorous branches which have been saved should be cut back to about the same length as the shorter laterals. This method practically insures a strong framework which will not break down.

Pruning During the Formative Period

Pruning after the first season's growth consists of making a final selection of scaffold branches. While most of these will be the same as selected originally, it may be necessary to make slight readjustments. From this point on, the effort should be to develop a symmetrically open bowl-shaped tree removing branches which tend to grow inward and those which are growing straight up through the center of the tree. Scaffolds should be headed back slightly if growth has exceeded thirty inches with little or no branching. On scaffolds which have made less than thirty inches growth with several side branches all but two or three well spaced side branches should be removed. Laterals on a scaffold branch which grow out and slightly upward from left and right, are most desirable. Those which tend to grow towards the ground should be removed. All branches other than scaffolds, which arise from the trunk, should be removed.

From the second to the fourth year an annual removal of branches which interfere with the growth of the scaffold limbs is essential but severe pruning should be

avoided as this will delay the time when the tree will start to produce a profitable crop.

Pruning Bearing Trees

Peaches are borne laterally on shoots that grew the previous year. Therefore, the stimulation of one year shoot growth by fertilization and pruning is essential for maximum yields of fruit. Generally, on a vigorous one-year shoot three buds will be produced at each node. The two plump outside buds will be blossom buds and the smaller bud in the center will be a leaf bud. On less vigorous shoots there may be but one fruit bud and a leaf bud at a node.

There are several reasons for the annual pruning of a peach tree as follows:

1. To eliminate weak shoots.
2. To stimulate the growth of vigorous shoots.
3. To keep the tree at a convenient height.
4. To admit light to the center of the tree.
5. To permit effective use of spray materials.
6. To partially thin the crop.

In pruning a bearing tree the following branches should be removed:

1. Those which are broken or diseased.
2. Those which are slender and weak - especially on the inside of the tree.
3. Those which grow toward the center or straight up.
4. Those which are growing downward so as to interfere with mowing or cultivating equipment.

After these branches are removed, it may be necessary to thin out moderately a few of the more vigorous branches where they are too thick.

"Leggy" branches (those which grow out for a considerable distance without branching) may need to be headed back in order to induce the development of side branches nearer the trunk.

Since the habit of growth of a peach tree tends to produce bearing wood further and further from the trunk, it is desirable to encourage the development of some young branches on the inner parts of the tree. These branches should be so located as to subsequently replace older wood.

In order to keep the tree at a convenient height, upright branches should be headed back to an outward growing lateral branch when they reach a distance of approximately eight feet from the ground.

Pruning Winter-Injured Trees

Peach trees may suffer injury from low winter temperatures in two ways:

1. By killing of the blossom buds.
2. By killing of the wood.

Under Massachusetts conditions, the critical winter temperature for the killing of blossom buds is about -15°F . The exact temperature at which blossom buds will be killed depends upon the variety as some are more hardy than others. The extent of blossom bud injury can be determined by cutting several buds and noting if they are black in the center. If all of the buds are killed, an opportunity is provided to reduce the proportion of old wood without affecting the crop since there would be no crop the following summer anyway. This will tend to stimulate the development of new growth nearer the trunk.

With more severe temperature (-20°F . or lower) the wood may be injured in addition to the buds. This condition is indicated by the inside of a branch turning dark brown or black. When this condition exists, it is best not to prune the tree until after growth starts. Then, only weak shoots on the interior of the tree and dead branches should be removed since the tree will need every healthy leaf to help repair the damage.

Because of the possibility of winter injury in one form or the other, peach trees should be pruned in the latter part of February or in March, after the extent of injury can be determined.

Since the pruning wounds on a peach tree are normally relatively small, and heal rapidly, no wound dressing is required.

---O. C. Roberts

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

MARCH 15, 1956

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YOUR POMOLOGY DEPARTMENT

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Teaches small fruits and general fruit growing courses.

Bailey, John S. - Associate Professor, Research - Stationed at East Wareham.

Doing small fruit research on strawberries, blueberries and beach plums.

Mr. Bailey also handles considerable of the small fruits extension program.

French, Arthur P. - Head of Department

Does some teaching in Pomology and in Plant Breeding, active in small fruit variety testing.

Lord, William J. - Extension Fruit Specialist

Connected chiefly with fruit growers' problems, other than pest control, and is somewhat involved in research. Editor of FRUIT NOTES.

Roberts, Oliver C. - Associate Professor

Teacher of pest control, fruit marketing and other departmental courses. Currently also doing research on fruit marketing.

Southwick, Franklin W. - Professor, Research

Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also, teaches in certain advanced courses.

Weeks, Walter D. - Assistant Professor, Research

Active on research in nutrition, root stocks, variety and strain tests and winter hardiness. Also, teaches certain advanced courses.

Contributors to This Issue from Supporting Fields

L. D. Rhoades - Extension Specialist Farm Management

E. H. Wheeler - Extension Entomologist

Dr. Southwick on Leave

Frank Southwick and family left Amherst the last of January to spend six months on the West Coast searching for new ideas. He plans to spend most of that time at the Agricultural Experiment Station at Davis, California. While there he expects to have intimate contact with their research program thereby learning what the problems of their fruit industry are, how they attack them and what they have discovered that may be of use to Massachusetts fruit growers. We shall hope to hear from him occasionally and shall look forward to his return August 1st.

---A. P. French

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OBSERVATIONS IN CALIFORNIA

After a fairly rough trip of 3600 miles (600 miles in snow) my family and I finally made it to Davis, California, where the University of California College of Agriculture is located. It is here that we plan to spend approximately five months of my Sabbatical leave. As you may know the University of California has eight different campuses, this one at Davis is located in North Central California, about 15 miles west of Sacramento and about 75 miles east of San Francisco. The campus here is large (3000 acres), well staffed (about 25 pomologists) and well equipped. They have about 300 acres of fruit land for teaching and research purposes with about half of this area at Davis and the other half about 15 miles away at Winters (the earliest apricot section in California).

One of the most obvious things that is apparent to an Easterner, as we drove from Bakersfield north (after coming over the Mohave desert) to Sacramento, is the huge acreage of grapes grown here. If my recollection is correct California produces at least 90 percent of all grapes grown in the U. S. They are vinifera grapes grown for raisins, table use, and wine. Total acreage of grapes is nearly half a million acres. In 1954 the total acreage of fruit and nut crops in California was about 1,400,000 acres. This acreage includes all tree and nut fruit crops such as almonds, apricots, citrus, figs, apples, avocados, cherries, pears, plums, peaches, walnuts, etc. with the exception of small fruits. Hence, grapes represent about 35 percent of the total fruit acreage. It is not surprising, therefore, that there is a separate department here (Viticulture) which deals with grape problems exclusively.

Another thing which has impressed me so far is the large size of peach and pear trees and the vigorous growth of their fruit trees, generally. Peach trees 12 - 15 feet high are commonplace and the best orchards may yield up to 30 tons per acre. Tons I find are the unit of measure here. Pears may yield up to 25 tons per acre or 1100 - 1200 boxes per acre. Individual Bartlett trees may yield 40 or more 44 lb. boxes per tree. Even the strawberry does unusually well by our standards. I am told that the Shasta variety, grown by the hill system, produces more or less continuously throughout the spring and summer and may yield as high as 30 tons per acre. In other words, strawberries may out yield many tree fruits on an acre basis.

Of course, weather wise, it is a little different here in February than in Massachusetts. The average maximum temperature for February is 58° F at Sacramento

with the average minimum above freezing. When we arrived here in early February almonds were beginning to bloom. Several varieties are about in full bloom now (February 20). Apricots will reach full bloom shortly, with peaches close behind. No need for anti-freeze in the car.

Although they may get heavy rains during the winter the large majority of the fruit acreage in California must be irrigated during the hot dry late spring and summer months. A great deal of this irrigation water is obtained from wells. These wells may be 200 - 300 feet deep but a good well, I am told, is capable of delivering 1000 gallons per minute.

The soils in many of the fruit areas are very deep and fertile. Fruit trees apparently root to great depths (10 - 15 feet or more) even though some of the soils may be rather heavy loams which by Eastern standards would not be considered ideal for best tree performance. Soils are sufficiently fertile and deep in some areas at least so that pear trees in some demonstration orchards have failed to respond in yield to nitrogen applications over the past five years. In other words, trees receiving no nitrogen for the past five years have, in some cases yielded as well as adjacent rows of trees receiving soil or foliage applications of nitrogen for the past five years. Also, Bartlett pears in some areas, bear very well when planted in solid blocks with no provision for cross-pollination. Most of the Bartlett fruits in such blocks are seedless or nearly so.

Everyone here at Davis has been very cordial and hospitable. They have provided me with office space and stenographic help. Their staff is willing and anxious to show me around and they have got plenty to show.

---F. W. Southwick

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SPECIAL CIRCULARS RECENTLY REVISED

The following circulars have been revised and are available to anyone wishing a copy.

Special Circular #212-D Varieties of Strawberries for Massachusetts.

Special Circular #212-E Varieties of Blueberries for Massachusetts.

Special Circular #212-F Varieties of Raspberries and Blackberries for Massachusetts.

Special Circular #189 Chemical Thinning of Apples and Peaches.

Address requests to either the Department of Pomology or the Mailing Room, University of Massachusetts, Amherst, Massachusetts.

--- W. J. Lord

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FLESH FIRMNESS OF THE SPARTAN APPLE

Many Massachusetts fruit growers who attended the recent fruit meeting in Worcester will remember how much they enjoyed eating the Spartan apples which were passed out at one of the sessions. A few of the apples were left over and taken back to Amherst. Fruit firmness was determined with a pressure tester and the average pressure was found to be 13.5 pounds. Thus, these apples were 3 to 3-1/2 pounds firmer than most of the McIntosh which were in storage at that date. If this characteristic of fruit firmness is maintained by the Spartan apple it would appear that this is the variety we have been looking for to extend the marketing season of high quality dessert apples.

---W. D. Weeks

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APPLE FERTILIZER RECOMMENDATIONS FOR 1956

It should be recognized from the start that it is not possible to give specific recommendations for individual orchards in an article of this nature. These recommendations are presented to serve as a guide to the fruit grower for determining the fertilizer program in his orchard.

In view of experimental evidence and the results of leaf analyses taken from several growers' orchards, it is no longer possible to recommend a nitrogen alone program for fertilizing Massachusetts orchards. In order to prevent the occurrence of potassium, magnesium and boron deficiencies it becomes necessary to apply fertilizer materials which will supply these elements.

The following tables give suggested rates of fertilizer to use which will supply the nitrogen and potassium requirements of the tree. The first table presents two plans in which ammonium nitrate is used in combination with muriate of potash or 0-15-30. The second table shows the amounts to apply of two different mixed fertilizers which will supply equivalent amounts of nutrient elements.

Suggested Rates of Fertilizer for Bearing Apple Orchards

Potential bushel Yield of tree	Approximate amounts per tree				
	Nitrogen required	Ammonium Nitrate	Potassium required	Muriate of Potash or	0-15-30
	Pounds	Pounds	Pounds	Pounds	Pounds
Less than 15	0.66	2.0	1.3	2.1	4.3
15-25	0.66-1.00	2.0-3.0	1.3-2.0	2.1-3.3	3.4-6.6
More than 25	1.33-2.00	4.0-6.0	2.7-4.3	4.5-7.1	9.0-14.3

Suggested Rates of Fertilizer for Bearing Apple Orchards

Potential bushel Yield of tree	Approximate amounts per tree			
	Nitrogen required	Potassium required	5-10-10 or	8-16-16
	Pounds	Pounds	Pounds	Pounds
Less than 15	0.66	1.3	13	8
15-25	0.66-1.00	1.3-2.0	13-20	8-12
More than 25	1.33-2.00	2.7-4.3	26-40	16-25

The suggested amounts of materials to apply given in the tables are for band applications under the spread of the branches. When the materials are broadcast over the entire orchard floor it may be necessary to increase the rates of application in order to obtain the same tree response as the band applications. Fertilizer materials other than those given in the tables may be used so long as they are applied at rates which provide equivalent amounts of nitrogen and potassium.

The magnesium requirements of orchard soils can best be met by applying sufficient dolomitic lime (high magnesium lime) to maintain a soil pH of 6.0 to 6.5. In orchards which have had an inadequate liming program, it may be necessary to apply magnesium sulfate (epsom salts) sprays to prevent the occurrence of magnesium deficiency. Two or three sprays of epsom salts (20 pounds to 100 gallons) applied at calyx, first and second cover are suggested as a temporary measure to correct magnesium deficiency until soil applications of dolomitic lime are able to meet the trees' magnesium requirements.

Boron should be applied to orchard soils every three to five years. Borax is the most common material used. The rates of application per tree vary with age and size. Apply one quarter pound of borax on young trees, one-half to three-quarters pound on medium age and size trees, and three-quarters to one pound on large or mature trees. In no case should the rate of one application of borax exceed 50 pounds per acre.

The amounts of fertilizer applied to trees which have received annual applications of 200 pounds or more of hay mulch per tree may be materially reduced or entirely eliminated. Tree performance should serve as a guide in determining the extent to which the rates of fertilizer may be reduced. In young non-bearing orchards it may be possible by broadcasting 500 to 800 pounds of mixed fertilizer per acre to produce sufficient high quality mulching material in the orchard for the young trees. Place the mulch in a band under the spread of the branches. The amount of fertilizer required for the trees with this system of culture will vary with the quantity and quality of mulch applied around each tree. If the trees are not making sufficient growth one-eighth pound of ammonium nitrate per year of tree age may be applied to the mulch.

Early spring is the best time to apply fertilizer to apple orchards. It should be applied four to six weeks before bloom. This allows for maximum absorption of fertilizer in the early part of the season which is the period of greatest need.

---W. D. Weeks

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POMOLOGICAL PARAGRAPH

Are You Going to Plant Trees Next Spring? - If you are going to plant fruit trees this spring, it might be worth your while to read Leaflet #182. The title of this leaflet is "Establishing Orchards" and is written by W. D. Weeks. Copies of this leaflet may be obtained from your County Extension Office or the Mailing Room at the University in Amherst, Massachusetts.

---Editor

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SEMI - DWARF TREES

Recently there has been renewed interest in semi-dwarf trees. They commence to bear earlier and are easier to prune, spray and harvest than trees on seedling roots. With semi-dwarf trees a large proportion of the crop can be picked from the ground and/or with a short step ladder. It is the purpose of this article to discuss the classification of Malling apple rootstocks recommended for use in Massachusetts orchards. In addition, yield data, planting distances and suggested planting plans for semi-dwarf trees are presented.

Rootstocks Recommended for Massachusetts

1. Malling VII and II

These may be classified as semi-dwarfing stocks, for trees on these stocks, under our conditions, are approximately 60 per cent the size of a given variety on a standard seedling rootstock. The size of tree depends considerable upon the variety. More vigorous varieties, like McIntosh, Macoun, and Northern Spy are dwarfed less on VII than less vigorous varieties, like Cortland and Rome.

At the Geneva Experiment Station, it has been found that trees on II are more vigorous than those on VII. At Amherst, however, McIntosh trees on VII are more vigorous than those on II. The average tree spread of 11 year old trees on VII and II is 21 feet 8 inches and 18 feet 7 inches respectively. Each average was based on the tree spread of ten trees.

2. Malling I

Trees on this rootstock are approximately 75 per cent the size of the same variety when on a standard rootstock. Although Malling I induces earlier bearing in varieties worked on it and is productive on fertile, well drained soils, the dwarfing effect is probably not enough for growers wanting a semi-dwarf tree.

3. Malling XIII

Varieties on this stock do well in heavy soils having poor drainage. Trees on XIII are approximately 75 per cent the size of the same variety when on a standard stock. Growers planning to plant semi-dwarf trees on heavy, poorly drained soils should consider XIII.

On the basis of our experimental results obtained with semi-dwarf trees, Malling VII and II are the dwarfing stocks generally recommended for planting in Massachusetts.

Planting Distance

VII	-	20' x 30'
II	-	20' x 30'
I	-	30' x 40', or 35' x 40'
XIII	-	30' x 40', or 35' x 40'

Yield

The following table shows the yield of McIntosh trees on Malling VII and II. The trees were planted as one year old whips on November 3, 1943. The trees were planted 20' x 20' and in the fall of 1953 every other row of diagonal trees were removed leaving the trees 28' apart. No yield data was obtained in 1954.

Average Yield per McIntosh Tree on Semi-Dwarf Stock					
Year	No. Trees per treatment	Dwarfing Stock		Potential Yield Per Acre (1)	
		II	VII	II	VII
		Bu.	Bu.	Bu.	Bu.
1950	20	1.6	1.0	115	72
1951	20	1.3	2.4	94	173
1952	20	2.4	1.2	173	86
1953	20	2.9	4.5	209	324
1955	10	4.5	5.7	324	410

(1) Trees planted 20' x 30' = 72 trees / acre.

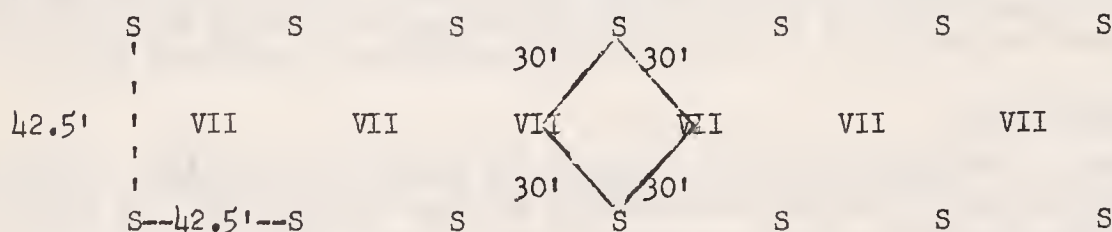
Suggested Planting Plans

Plan A. is for a permanent planting of Malling VII. Trees are spaced 20' x 30' making 72 trees per acre. The same planting distance can be used in case of Malling II.

In Plan B. the varieties on Malling VII are used as fillers in the row. The trees on seedling roots are planted 40 feet in the row with the semi-dwarf trees used as fillers. Malling II can be substituted for VII.

With Plan C. the varieties on Malling VII or II are planted in the center of the square. With this planting plan, it should not be necessary to remove the semi-dwarf trees as soon as would be the case in Plan B.

PLAN C

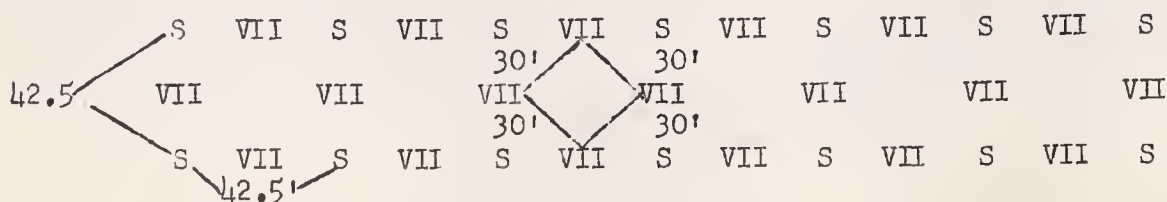


48 trees per acre

24 trees per acre (semi-dwarfs removed)

In Plan D the grower has the option of removing either the trees on seedling roots or those on dwarfing stocks when crowding begins.

PLAN D



96 trees per acre

48 trees per acre (trees on seedling roots removed) 24 trees per acre (semi-dwarfs removed)

APPLE TREE NUTRITION

The writer attended the last day of the 101st meeting of the New York State Horticultural Society. The highlight of the day was the panel discussion on "Improving the Nutrition of Our Trees for Better Apples".

As part of the panel, Prof. C. G. Forshey of the New York State Experiment Station spoke on the "Fertilizing Problems that the Hudson Valley Faces". In his talk he gave the results of a leaf analysis survey made in 57 problem orchards in the Hudson Valley. Seventeen orchards were deficient in nitrogen. Potassium was deficient in 19 of the 57 orchards. A reduction in yield due to the potassium deficiency was apparent in 11 of the 19 potassium deficient orchards. Ten of the orchards were deficient in magnesium. Five of these ten were deficient both in magnesium and potassium. Two orchards were deficient in boron and two in manganese.

At the 65th Annual Meeting of the Connecticut Pomological Society, the writer had the pleasure of listening to Prof. Fred Emmert of the University of Connecticut discuss the results of the foliar analysis survey taken from 40 orchards throughout the state of Connecticut. Nitrogen was below the desirable range in nine per cent of these orchards and was too high in 24 per cent of them. Twenty-four per cent of the orchards were deficient in potassium, 65 per cent in calcium and 42 per cent in magnesium. The soil under 87 per cent of the test trees was below pH of 5.6.

The results of leaf analysis surveys in Hudson Valley and Connecticut, in most respects, were similar to those obtained from a leaf analysis survey made in Massachusetts in 1953. In this survey, magnesium was below the desirable range in 40 per cent of the orchards surveyed. Thirty-seven per cent was deficient in calcium and 20 per cent in nitrogen and potassium.

It is apparent that in Connecticut and New York, as well as in Massachusetts, the fruit grower has need for other elements besides nitrogen in his orchard fertilizer program.

Another point of interest that was "gleaned" at the Connecticut meeting is that, C. P. Harley, Senior Physiologist, Beltsville, Maryland, felt that potassium may influence the development of red color in apples. This is in agreement with experimental findings of Weeks and others at the University of Massachusetts. Our fertilizer experiments with McIntosh apple trees showed that fruit color is associated with both the nitrogen and potassium levels found in the foliage. "The poorest colored fruit was produced by trees which were high in nitrogen and low in potassium. Fruit of high color was produced by trees with medium levels of nitrogen and high levels of potassium."

Another comment made by one of the speakers at the meetings was that annual production cannot be maintained by high rates of nitrogen and that it is generally best to maintain a medium level of nitrogen in our McIntosh trees. This is in agreement with experimental evidence obtained in Massachusetts.

---W. J. Lord

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POMOLOGICAL RESEARCH

10. Nutrition of the Highbush Blueberry.

The feeding of highbush blueberries is an exceedingly important part of their culture. The questions which at once arise are: What should be used and how much? Should a complete fertilizer be used? Or should only one or two elements, say nitrogen and potassium, be used? This project was started to answer such questions as these and others of a similar nature.

One of the first problems in nutrition of highbush blueberries involved the yellowing of the leaves. This was thought to be caused in most cases by a deficiency of iron. This trouble is not general in Massachusetts. It occurs in spots and may be quite serious in small areas. The relationships are rather complex and will be discussed in a separate article.

Severe magnesium deficiency was found in one field several years ago. It has been suspected in other fields. It is not a common deficiency in blueberry fields but where it becomes serious it can very materially reduce both size of crop and size of berries. It is fairly easily remedied by soil applications of epsom salts or dolomitic limestone. The latter must be light unless the soil is very acid. A recent attempt to correct magnesium deficiency by spraying epsom salts on the leaves was unsuccessful. Since the blueberry leaf is very waxy and sheds sprays very readily, this is not surprising. Soil applications of chelated magnesium were not effective either.

Blueberries, as is the case with other fruit plants, give the quickest and greatest response to applications of nitrogen. Therefore, the nitrogen alone program might have been adopted by blueberry growers if it hadn't been learned early in the life of the industry that a complete fertilizer worked best in the field. The use of nitrogen alone for a number of years may affect fruits adversely in two ways. First, the failure to apply other elements and the increased demand for them resulting from increased growth following the nitrogen application may cause a deficiency of one or more elements. Second, the excess of nitrogen in relation to the other elements may upset the nutritional balance of the plant with consequent reduction in growth and yield.

Nutritional balance in a number of fruit plants has been under study for several years. The usual method is to analyze the leaves chemically for nitrogen, phosphorous, potassium, calcium, magnesium, and sometimes other elements. The amount of each element is then studied in relation to its effects on other elements, on yield, color, quality of fruit, etc., and on their inter-relationships.

This type of nutritional study has been very scanty in the case of cultivated blueberries. A few leaf analyses have been published but these have not been sufficient for a thorough study. Results published from this station in 1949 showed that the highbush blueberry appears to have a very low phosphorous requirement.

To make a start on working out the nutritional relationship of highbush blueberries a large number of blueberry plantings in various parts of the state were visited, leaf samples collected, and growth measurements made. The leaf analyses for nitrogen, phosphorous, potassium, magnesium and calcium have been completed. After the results have been analyzed, they will be published and used as the basis for further experiments. The ultimate objective is to correlate chemical analyses with some quick, easy, field tests which the grower can use to help him decide what elements he needs to apply and how much.

---J. S. Bailey

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IMPORTANT

What a difference three little letters can make - see below.

CORRECTION: You should make this change in the chart listing materials useful in the control of Red Mite which was published in the February issue of Fruit Notes.

Under TEPP in column three (2) it should read: "NOT compatible with glyodin and mercury." Please make the change in your copy.

In fact, none of the organic phosphate materials should be used in the same spray with a phenyl mercury if you wish to be completely safe.

OMISSION: In the same chart, four ounces of demeton is enough In a Pink or Calyx application. The amount should be increased in later sprays.

Also, demeton is not compatible with phenyl mercury.

---E. H. Wheeler

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Kelthane M
(FM-293)
25% WP 1½ lbs.

(For trial only)

1-2 applications in July and August as per label restrictions.

- (1) shows much promise against mites; long residual effect, a non-phosphate; not hazardous.
- (2) no effect upon other pests; all compatibilities not known but appear O.K.; effect of higher concentrations not known; a lack of grower experience at present.

malathion
25% WF 2 lbs.

2 or 3 well-timed applications in July and August as under Aramite, or in 1 or 2 sprays in sequence with a non-phosphate material.

- (1) kills other insects hit by spray, including bud moth; some residual effect; controls green aphid; non-hazardous to apply; partial substitute for DDT; O.K. up to 3 days of harvest.
- (2) resistant strains may develop; residual effect not as good as some others.

over
50% WP ½ lb.

Continue program started against Red Mite; follow label restrictions.

- (1) compatible; not hazardous to handle; kills eggs and young active stages; may be useful added to a phosphate like TEPP.
- (2) no effect upon any other pests; over spraying and higher concentrations may cause some russetting and foliage injury, especially when applied early in season.

carathion
15% WP 1½ lbs.
(reduce to 1 lb. on McIntosh and relatives)

Same as above under malathion; follow restrictions on labels.

- (1) same as above under malathion (except Hazardous) but slightly longer residual effect; excellent against bud moth; some kill of other insects.
- (2) HAZARDOUS; injury to Macs and related varieties, unless concentration kept at 1 lb. or lower; injury more severe under slow drying conditions; resistant strains may develop.

TEPP
40% ¼ pint
20% ½ pint
(use reduced dosages in concentrates.)

Same as above under malathion.

- (1) kills other insects hit by spray; controls green aphid; O.K. close to harvest.
- (2) HAZARDOUS to handle; no residual effect; not compatible with Elyodin; resistant strains may develop; apples close to nozzles, especially Yellow Delicious, may show brown spotting; russeted ring sometimes formed where drop of spray dries; must avoid high temperatures.

Note: None of these materials (except demeton) will handle 2-spotted mite unless applied thoroughly to the undersides of the leaves all over the trees; you have to put the material where the mites will contact it.

Alphabetical List
of MATERIALS and
AMOUNTS per 100 (dilute)

WHEN and HOW
MANY TIMES

(1) What's GOOD and (2) What's NOT so GOOD
and OTHER RELEVANT REMARKS

B. TWO-SPOTTED MITE (A. Other Mites - see previous issue)

(Summer infestations of other mites also controlled; some materials control green aphid also.)

Aramite
15% WP 1½ lbs.

Mid-June through August; 2-3
well-timed sprays. Regular
Covers often too far apart.

(1) a non-phosphate; safe to apply; compatible; considerable residual effect, especially in hot, dry weather; useful up to 14 days before harvest; protects beneficial forms.

(WP = wettable powder)

(2) slow acting; loses value rapidly in rainy, humid weather; no effect upon other insects or mite eggs.

Chlorobenzilate
25% WP 1½ lbs.

(For extensive
trials)

2-3 summer applications as under
Aramite and as per label restrictions.

(1) non-phosphate; non-hazardous to handle; considerable residual effect.

(2) no effect upon other pests or mite eggs; a lack of grower experience at present; full effect of over spraying and high concentrations not known; all compatibilities not known.

demeton

21% EC 6-8 oz.

(For extensive
trials)

1-2 applications in late June
or by mid-July. Note label
restrictions as to number of
treatments.

(1) a systemic phosphate; easy on beneficial types; kills aphids; up to 21 days of harvest; appears compatible.

(2) HAZARDOUS to handle; lack of grower experience; no control of non-sucking insects except possibly as hit by spray; full picture on russetting, foliage injury is not known but appears O.K.; restricted as to number of applications; follow labels.

EPN-300

25% WP 1 lb.

2-3 applications in July and August as under Aramite or as under malathion.

(1) an organic phosphate; same as below under malathion but longer residual effect; some effect on other pests.

(2) cannot be used on McIntosh and related varieties; otherwise like malathion except HAZARDOUS; kills beneficial forms; use not closer than 21 days of harvest; avoid poor drying conditions.

Note: Adjust and handle airblast machines so as to obtain the necessary, thorough coverage.

SUGGESTIONS TO THOSE PURCHASING STRAWBERRY PLANTS

The purchase and planting of virus-free plants of those varieties which are available is strongly recommended. Virus-free strawberry plants (with the possible exception of Premier or Howard 17) grow more vigorously and give greater yields than do non virus-free plants.

The growing of virus-free strawberry plants for sale is a specialized job. It requires long range planning and strict control. Special equipment and methods must be fully understood and used properly to obtain plants that can be listed as virus-free. It is a job for nurserymen willing to make a special effort to produce virus-free plants for sale to growers.

The procedures recommended on the next page are designed to produce plants as nearly virus-free as possible. After plants are removed from a screenhouse and grown in the field, a very small percentage may become infected with virus. Therefore, such plants are said to be "essentially" virus-free. You can be sure the plants you buy are "essentially" virus-free only if your nurseryman follows these recommended practices.

You can help yourself and the strawberry industry by satisfying yourself that your plant grower is doing the right kind of a job. Reliable nurserymen welcome inquiries and visits by their customers.

PRACTICES REQUIRED TO PRODUCE VIRUS-FREE STRAWBERRY PLANTS

A. FOUNDATION STOCK. (Plants known to be virus-free and used to produce Propagation Stock.)

1. Original stock should come from an approved source of virus-free plants and be free of all other diseases and pests.
2. Plants should be grown in a well constructed and properly maintained screen house in which the soil is fumigated and insects are controlled.
3. Stock should be renewed every second year or "indexed" to be sure it is still virus-free.

B. PROPAGATION STOCK. (Plants which the nurseryman uses to increase his own supply of mother plants to produce "essentially" virus-free Planting Stock.)

1. The planting should be isolated from all other strawberries, both cultivated and wild. A distance of 3000 feet is very desirable.
2. The land should have no history of red stele or other soil-borne diseases.
3. The soil should be fumigated for nematode control.
4. The plants should come from virus-free Foundation Stock and be free of all other diseases and pests.
5. The planting (and all nearby strawberry plants) should receive the complete, recommended dust or spray program to control aphids which carry virus.

C. PLANTING STOCK. (Plants set by the nurseryman to produce plants to sell to berry growers as "essentially" virus-free.)

1. Isolate the planting as far as possible from all other strawberries, both cultivated and wild. A distance of 3000 feet is very desirable.
2. The field must have no history of red stele or other soil-borne disease.
3. The plants used should be no more than one year removed from an approved source of Foundation Stock, i.e., should have been grown as outlined under B.
4. The planting (and all nearby strawberry plants) should be protected fully, throughout the season, by dusts or sprays as recommended to control aphids.

D. ADVERTISING AND PROMOTION

1. Plants produced as outlined above should be "essentially" virus-free and should be sold as such.
2. Varieties for which virus-free strains are not available should not be sold as virus-free.

---J. S. Bailey

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HOW TO FIGURE THE AMOUNT OF FERTILIZER TO APPLY

In the past when orchard fertilization was discussed the orchardist heard --- "You should apply so many pounds of ammonium nitrate, urea, 5-10-10 or some other fertilizer". Since there are so many fertilizers now being sold, it is more logical when discussing fertilizer needs to talk in terms of actual nitrogen, potash (K_2O) and phosphoric acid (P_2O_5). *It has been noted, however, that this has been confusing to some growers when they try to figure how much of a nitrogenous fertilizer or a "complete" fertilizer should be applied to equal a certain amount of actual nitrogen, potash or phosphoric acid. Therefore, it is hoped that the following discussion will eliminate some of the misunderstanding.

In our fertilizer recommendations we state that a tree capable of producing 25 bushels of apples should receive approximately one pound of actual nitrogen. If we are going to use some common nitrogenous fertilizer how many pounds must be applied to equal a pound of actual nitrogen? To determine this, divide the actual amount of nitrogen needed by the per cent nitrogen in the nitrogenous fertilizer. For example if you are using a nitrogenous fertilizer containing 33 per cent N, divide 1.0 pound by .33 which will give an answer of approximately 3 pounds of the nitrogenous fertilizer that must be applied to be equivalent to 1.0 pound of actual nitrogen.

Similarly, suppose you want to apply 1.5 pounds of actual nitrogen and you are using a nitrogenous fertilizer containing 45 per cent N, divide 1.5 pounds by .45 which will give an answer of approximately 3.3 pounds of the nitrogenous fertilizer to be equivalent to 1.5 pounds of actual nitrogen.

Suppose you are using a 5-10-10 fertilizer, how many pounds must be applied to equal one pound of actual nitrogen? How many pounds of potash and phosphoric acid will be added when enough 5-10-10 is added to equal one pound of actual nitrogen?

A 5-10-10 fertilizer contains an amount of total nitrogen as would be equivalent to five per cent of nitrogen, an amount of available phosphorous equivalent to ten per cent of phosphoric acid and available potash equivalent to ten per cent of potash (K_2O). Since the mixed fertilizer contains an equivalent to five per cent N, divide one pound of actual nitrogen wanted by .05 which will give an answer of 20 pounds of 5-10-10 to add in order to apply one pound of actual nitrogen. If you apply 20 pounds of 5-10-10, two pounds of potash (K_2O) and two pounds of phosphoric acid are added. These answers are obtained by multiplying the 20 pounds of 5-10-10 by the per cent potash and phosphoric acid respectively in the fertilizer.

---W. J. Lord

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HOW TO BORROW MONEY IF YOU NEED IT

Get the Most for Your Money Modern farming requires large amounts of operating credit as well as long-term capital financing.

Buy credit as you buy feed and fertilizer - from dependable sources - at lowest net cost. Be in a position to pay cash for materials bought and demand best prices and services.

Use Farm Account Book Too much credit or credit unsuited to the farm program being financed, can be as detrimental to the farm as no credit at all. Be in a position to determine in advance the money required to carry on your farming business.

Plan for Credit in Advance A sound loan should pay out in profit to you. Estimate your sources of income as a guide to orderly repayment.

There is a very real difference between financing a farm operation and merely making a loan or extending credit for some specific purchase. There is a very real difference, also, between a sound loan and a safe loan. A sound loan must be:

1. A benefit to the borrower and safe for the lender.
2. Adequate but not too much.
3. Available as needed.
4. Liquidated from normal sources with payments geared to income.

Know Where to Borrow Lending institutions are in the specialized business of loaning money. Figure the net cost of the money before you borrow. You may pay anywhere from 4% to 11-1/2% on a "6% interest rate" depending on how the loan is figured.

Get Debts Together in One Place Split credit costs more - limits ability to borrow money - weakens your credit rating, and invites pressure from all creditors. Use regular lending agencies, meet obligations promptly - protect your credit rating in the business community.

Do Not Over-borrow Be sure to keep something in reserve including the ability to borrow more money if needed. Be prepared to meet the unexpected - hospital bills, farm price upsets, crop failures and changing economic conditions. Buy your credit as you now buy feed, fertilizer, spray material, or machinery. Use those agencies which offer the lowest rate consistent with the service rendered. Remember, you are not asking for favors when you apply for a sound loan.

---L. D. Rhoades

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

APRIL 15, 1956

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YOUR POMOLOGY DEPARTMENT

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Teaches courses in general Pomology, small fruit culture and systematic Pomology.

Bailey, John S. - Associate Professor, Research - Stationed at East Wareham,

Doing research on strawberries, blueberries and beach plums. Mr. Bailey also does considerable Extension work with small fruit growers.

French, Arthur P. - Head of Department

Does some teaching in Pomology and in Plant Breeding, active in small fruit variety testing.

Lord, William J. - Extension Fruit Specialist

Chiefly connected with fruit growers' problems, other than pest control, and is somewhat involved in research. Editor of FRUIT NOTES.

Roberts, Oliver C. - Associate Professor

Teacher of pest control, fruit marketing and other departmental courses. Currently also doing research on fruit marketing.

Southwick, Franklin W. - Professor, Research

Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also teaches in certain advanced courses. (At present on Sabbatical leave at the University of California.)

Weeks, Walter D. - Assistant Professor, Research

Active on research in nutrition, root stocks, variety and strain tests and winter hardiness. Also, teaches certain advanced courses.

Contributors to This Issue from Supporting Fields

L. D. Rhoades, Extension Specialist Farm Management

E. H. Wheeler - Extension Entomologist

THE FORMATION AND DEVELOPMENT OF STRAWBERRY FLOWERS

The time of flower bud formation in the strawberry varies with the latitude, climatic conditions, species, variety and individual plant. In the latitude of Massachusetts flower buds of the June bearing varieties are initiated in the fall. Generally, the flower bud differentiation proceeds rapidly with many buds having well-developed flower parts in December. In Pennsylvania, the author has noted, blossoms may open on the Temple variety in late October.

Some experimental evidence shows that flower bud differentiation is affected by the nutritional level of the soil, particularly by the amount of available nitrogen. Strawberry plants starved for nitrogen at the time of flower bud formation will set less buds than plants having an ample supply.

Flower bud differentiation in runner plants differs according to time of the plant formation; the oldest plants differentiate flower buds earliest. This is why the Massachusetts strawberry grower should set his strawberry plants as early as possible in the spring. Early planting encourages the formation of early runner plants which produce a larger number of blossoms and are more productive than later formed runner plants.

With everbearing strawberry plants, the fruit that ripens in June developed from buds which were initiated the previous fall and the "second crop" is from flower buds initiated in late June and July.

The typical strawberry flower stalk or inflorescence is made up of a main, or primary, stem which is terminated by the "primary flower". Two secondary branches originate from the primary stem and are terminated by "secondary" flowers. From each of the secondary branches, two tertiary branches arise which are terminated by "tertiary flowers and from each tertiary branch two quaternary branches originate and are terminated by the quaternary flowers". A typical strawberry flower stalk has, therefore, one primary, two secondary, four tertiary, and eight quaternary flowers.

The primary flower opens first followed in order, by secondary, tertiary and quaternary flowers. Experimental evidence has shown that a positive correlation exists between flower position, flower part number, and size of fruit. The primary flower of the inflorescence has more flower parts, its pistils are more fertile, and it bears larger fruit than the later flowers of the inflorescence. Many of the fruits developing from the tertiary and particularly from the quaternary flowers are small, or maybe nubbins. Some of the last flowers to open may approach sterility. The mother plants and the earliest formed runner plants produce the largest number of flowers and are most productive.

The strawberry blossoms generally are pollinated by insects. The time from blossom to harvest averages about 30 days but varies with climatic conditions and varieties.

The strawberry is an aggregate fruit in which the individual fruitlets are what are commonly called seeds. That is to say, the seeds of the strawberry are the fruits and the edible part of the strawberry is largely enlarged stem tissue.

When pollination is inadequate and only a few ovules are fertilized and thereby only a few seeds develop the resulting strawberry will be misshapen.

--- W. J. Lord

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PLANT BUGS MAKE STRAWBERRY "NUBBINS"

Certain insects do cause "nubbins" in strawberries. The extent to which insects and their allies are involved may vary greatly from year to year and from planting to planting; there may be great variation in the different parts of a single small planting depending upon the vegetation in adjacent areas.

Some people call "nubbins" the small, undersized berries produced on weak plants. Certainly these small and often off-flavored fruits are undesirable. But as I am using the term "nubbins," I am thinking of berries which may be partly normal, but are otherwise hard, green, and misshapen.

Small, but otherwise well-shaped fruits result from a number of causes, some due to insect or mite activities. Severe infestations of Two-spotted Mite and Cyclamen Mite which destroy the natural green color of the foliage and weaken the plants often result in these small, almost worthless fruits. Injury by insects which bore into crowns or which feed upon the roots of the plants may not be severe enough to kill the plant outright, but yet cause a weakened condition which makes it impossible for the plant to produce a normal crop.

True "nubbins", however, are very likely the result of feeding by one of the sucking plant bugs. The False Tarnished Plant Bug in particular, is responsible for much of this kind of abnormal fruit. Spittlebugs, the true Tarnished Plant Bug and certain Stink Bugs also contribute to these losses.

The Plant Bugs are small, brown, rather inconspicuous insects about $1/6$ to $1/8$ of an inch long, winged and likely to be found in the more inconspicuous places around a plant. They insert their beaks and suck juices from whatever part of the plant they happen to be feeding upon. Their activities are not restricted to one or even a few kinds of plants, but include almost all of the common garden vegetables and fruits as well as most weeds and even shrubs and trees. Wherever a plant part is particularly succulent, there you find a favorable location for feeding by the False Tarnished Plant Bug and its relatives.

Plant Bugs overwinter in the adult stage in protected places in and around open fields, orchards, gardens of plantings of small fruits. If brushland, hedgerows or particularly weedy patches are adjacent to strawberry plantings, these offer favorite places for the insects to hibernate successfully. With the coming of warm weather during May and early June, the hibernating bugs become active and attack whatever plants are present and in a stage favorable for their feeding. The tender tips of developing strawberry fruits offer just such a situation.

As plant Bugs feed, they appear to secrete some material which causes the affected plant parts to grow abnormally. Often, parts of the tissue are killed outright by the action of the toxin. Strawberry fruits develop into misshapen, unsalable forms which we call "nubbins".

It should be remembered that "nubbins" caused by Plant Bugs are most likely to occur in plantings or parts of plantings which are adjacent to favorable overwintering places. Rank growth of weeds and other vegetation located near strawberry plantings are likely to attract large numbers of Plant Bugs during the

late summer and fall and thus a heavy overwintering population may occur in that area. Brushy hedgerows and the edges of woodlands are usually well populated with hibernating adults. Therefore, one should think about the location of the strawberry planting with respect to these conditions. Either locate the planting away from such areas or else control the growth of vegetation favorable to the Plant Bug.

Insecticides, used as individual strawberry buds separate from the cluster and again as the earliest blossoms open, will control Plant Bugs. DDT and several other insecticides are very effective against these and Spittle Bugs also. DDT and some related materials have one disadvantage which is important to consider. Their use in one or two applications just previous to bloom may result in a rapid buildup of the Two-Spotted Mite or Red Spider. Plantings have been observed where the damage from Two-spotted Mite was actually greater than that which might have been done by the insects being controlled. For that reason I would urge that when either DDT or methoxychlor is used on strawberries that it be combined with sulfur. Sulfur is fairly effective in checking buildup of Two-Spotted Mite on strawberries. A suitable formula for a dust might be one containing 5% DDT or methoxychlor and from 75% to 95% dusting sulfur. As a spray, for each 100 gallons of water use 2 pounds of 50% wettable powders of DDT or methoxychlor along with 5 or 6 pounds of a dry-wettable sulfur. Use proportionate amounts in smaller quantities of water. Malathion dusts and wettable powder sprays give fair to good control of Plant Bugs and also control the mites. They may be used along with DDT or methoxychlor as in "General-Purpose" mixtures.

Other effective materials will be found listed in the 1956 Pest Control Chart for Strawberries which is now available from your Cooperative Extension Service.

---E. H. Wheeler

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STRAWBERRY NUBBINS

The importance of pests and flower position in nubbin production have already been presented by Dr. Wheeler and Dr. Lord elsewhere in this issue. Other factors such as spring frost, cold wet weather and the nutritional status within the flower stalk also may be responsible for the formation of nubbins.

Spring frost may operate in one of three ways: It may (1) kill the anthers thereby reducing the supply of pollen; (2) injure the styles causing imperfect fertilization of the embryos; or (3) kill a part of the embryos even after fertilization has taken place.

Cold rainy weather may reduce the supply of pollen. It may also interfere with the flight of pollenating insects and retard pollen tube growth enough to reduce the number of embryos that are fertilized.

Small and imperfect leaves caused by drought, inadequate fertility in the soil, or any other factor may result in smaller fruit size. Furthermore, pistil fertility has been found to be less in blossoms from lateral crowns of a plant than in those blossoms originating from the central crown.

---A. P. French

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FACTORS INFLUENCING FRUIT SET OF APPLES

Of the many crucial periods in production and marketing of apples (from the flower bud to apple pie), the fruit-setting period is always a perennial source of anxiety to the grower. There are many factors affecting fruit set some of which can be controlled and others that cannot be controlled by the grower. Factors such as (1) site, (2) varieties, (3) location, choice and sufficient number of pollenizers, (4) nitrogen and (5) fungal, bacterial and insect injury are those which can be controlled by the grower. While on the other hand, the grower has little or no control over ecological factors, namely temperature, rainfall, wind and humidity. Pollenizing insects also affect fruit set but cannot be classified as either controllable or a non-controllable factor. Although the grower cannot provide favorable weather for bee flight, he can place hives of bees throughout his orchard to insure better cross-pollination. On the other hand, some years it may pay the grower to take the bee hives out of the orchard after a day of good pollenizing weather to help prevent over-setting of fruit.

Although the grower has little or no control over the ecological factors affecting fruit set, it is these that will be discussed in this article in hope that it will increase grower understanding of factors affecting fruit-set.

Temperature

Temperatures below 40°F during bloom not only prevent bee activity, but they either hinder or prevent pollen germination. Experiments with hardy fruit trees have shown there is some pollen germination from 40°F to 50°F but that pollen tube growth is greatly retarded. Optimum temperatures for pollen germination and pollen tube growth are from 70°F to 80°F.

Frosts just preceding or during bloom may reduce fruit-set considerably. However, the temperatures that flower buds and developing fruits will endure depend on many factors. The length of time the low temperature persists, the tree vigor, the weather preceding the frost, the variety and the stage of bud development all play a part in how much cold buds, blossoms, or fruits will stand. The buds or fruit on a healthy vigorous tree will endure lower temperatures than those on a weak tree when other conditions remain the same. A frost following a period of favorable growing temperatures will cause more damage than one following a period of cold, cloudy weather as the sap concentration is lower and freezing point higher during periods of warm sunshiny weather.

The temperature which deciduous fruits will endure at various stages of development are given in Table I.

Table I. Temperatures Endured for 30 Minutes or Less By Deciduous Fruits (Sheltered Thermometers)

Fruit	Stage of Development		
	Buds Closed But Showing Color	Full Bloom	Small Green Fruits
	°F	°F	°F
Apples	25	28	29
Peaches	25	27	30
Cherries	28	28	30
Pears	25	28	30
Plums	25	28	30

Source of Data:

Young, Floyd D. Frost and the Prevention of Frost Damage.
U. S. D. A. Farmers' Bul. 1588. 1940.

Detailed information as to what temperatures different varieties of apples will stand at various stages of development are not available. Incomplete data indicates that varieties of the Delicious group are less resistant to frost damage than any of the other commercial varieties grown in Massachusetts. McIntosh, Cortland, Early McIntosh, Milton, and Melba appear to be quite resistant to damage from spring frost as compared to varieties of the Delicious group. Late blooming varieties such as Northern Spy and Rome Beauty appear to be resistant to spring frost injury but how much their resistance is due to less advanced bud development is not definitely known.

Wind

High winds during bloom may desiccate the stigma and other flower parts. In addition, winds may injure the flowers to such an extent as to destroy their capacity of shedding pollen and setting fruit. Probably the most undesirable effect, however, is that bee activity is reduced considerably on windy days.

Humidity

High relative humidity may retard the release of the pollen and thus reduce the possibility of pollen transfer by insects. On the other hand, low humidity may dry the stigmas and reduce pollen germination. However, humidity low enough to affect fruit set would probably not occur under Massachusetts conditions.

Rainfall

Continuous rainfall during bloom retards the release of pollen, inhibits bee flight and thereby reduces fruit set. However, intermittent rainfall with periods of sunshine during bloom ordinarily does not adversely affect a commercial set. with favorable weather and plenty of bees only a relatively short time is necessary for adequate cross pollination. In trees with a "snow ball" bloom it takes only one blossom setting fruit in 20 for a commercial crop assuming five blossoms to a spur.

Water

Although a deficiency of water may reduce fruit set, in some plant species, it would seldom be a limiting factor in this aspect with tree fruit in Massachusetts. However, in some years probably tree growth may be significantly reduced because of drought and thereby have an adverse influence on subsequent crops.

---W. J. Lord

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SPECIAL CIRCULAR RECENTLY REVISED

The Special Circular #212-G entitled "Varieties of Grapes for Massachusetts" has been revised and is available to anyone wishing a copy. Address requests to either the Department of Pomology or the Mailing Room, University of Massachusetts, Amherst.

---Editor

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LIFE INSURANCE FOR FARMERS

Life insurance policies are contracts which provide that an insurance company guarantees the heirs of the insured a certain agreed sum of money to be paid when the insured dies. Cost is met by payments of premiums during the insured's lifetime.

Many different variations of contracts are available and designed to meet special needs or desires of the insured. Some common types are given below.

Ordinary or Whole Life insurance contracts are a type of policy in which the insured pays premiums until he dies or until he selects an option giving him "paid-up" insurance. The proceeds of the contract are payable at death though the policy builds up a loan or cash surrender value during his lifetime. This is the simplest and most common type of life insurance policy and gives the most permanent protection for the money spent.

Limited Payment Life policies give permanent protection and provide for payment of the face amount of the policy at the time of death. They also have a cash surrender or loan value that builds up as the insured pays premiums. It is different from the Ordinary life policy mainly in the premiums are completely paid up over a definite and limited period of time. Limited Payment Life policies are normally written at 20 to 30 year periods though they may read "paid up at 55" or "65" etc. Though the premium payment stops at the end of this period, the insurance protection continues. This has the advantage of enabling the insured to pay premiums during the years when he is most productive and earnings are most dependable. Since the time of premium payments is shortened, each individual payment is larger. The overall cost is much the same for the two types of policies.

Endowment policies provide life coverage with an additional emphasis on a savings or investment plan. This type of contract provides for payment of the face amount of the insurance contract either in the event of death of the insured during the endowment period or upon his survival at the end of the period. The insured has life insurance protection for the term of the endowment but the contract is dissolved at the end of the period and he is paid the face amount of the policy in a lump sum or installments. The period selected is usually 20 to 30 years though the policy may read that the endowment periods ends at age 48, 55, 65, etc. Depending on the length of the endowment period this is usually the most expensive type of life insurance (the least amount of protection per dollar of premium.)

Term insurance is a type of life insurance that covers the policy holder for a fixed number of years only. Such a policy may be written to provide coverage for one or more years but is usually for five, ten, or fifteen years. Under such a contract, commonly known as pure protection, the company will pay the face amount of the policy to the beneficiary if the insured dies during the term. If he survives the term of the policy, the contract expires and is canceled. The insured receives no endowment payment or surrender value. Premium costs rise with age and renewals are at higher rates. Usually this type of policy will give the maximum protection for minimum cost.

Family Income policies combine some of the features of the Ordinary Life and the Term type of coverage. The policy is arranged so that the insured has a decreasing amount of Term coverage that terminates after some selected time period and after which he has normal Ordinary Life coverage. For example, the decreasing Term is frequently geared to a mortgage schedule or to the time when the farmer's responsibilities are greatest. He may, therefore, provide maximum protection when it is most needed and still maintain a minimum amount of Ordinary Life coverage after the more pressing need is past.

Annuities are not a form of life insurance in the usual sense since benefits are generally paid for a period of time during the life of the policy holder and usually stop upon his death. Premiums are paid, either in lump sum or in installments with the agreement that the company will pay back a sum of money at stipulated intervals for a specified time. Life insurance policies frequently have an annuity feature as an optional payment plan.

The life insurance business is intensely competitive with higher standards being required of agents. Most companies have an active in-service training program designed to keep agents informed and "on their toes." In general premium rates for similar policies are quite similar. When comparing rates be sure to compare policies and policy provisions since different types of policies carry different premium rates.

---L. D. Rhoades

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POMOLOGICAL RESEARCH

11. Improvement of the Wild Lowbush Blueberry

The harvesting and sale of lowbush blueberries is of considerable importance in Massachusetts. There are two areas in the state where there is sufficient interest in this crop and the plants grow naturally in sufficient quantity so that a commercial industry has developed. One is in the southeastern part of the state in the towns of Granville and Blanford. The other is in northern Worcester County centered around the town of Ashburnham.

The fields in these areas are mowed regularly and burned every two or three years. The berries are harvested with metal "scoops" or "rakes" designed especially for that purpose. They are then put through a cleaning machine to separate the good berries from sticks, stones, leaves, and green and soft berries. This fruit is sold in quart baskets for fresh consumption or is placed in large ice cream cartons and frozen for bakery use.

Sometimes light applications of fertilizer are used in lowbush blueberry fields. Since the fertilizer stimulates both herbaceous and woody weeds as well as blueberries, the use of fertilizer often results in little or no increase in yield because of weed competition. Also, if weeds become too thick harvesting becomes very difficult or impossible. Therefore, in order to evaluate correctly the results of fertilizer applications, weeds need to be reduced to a minimum or eliminated.

The weed problem has been under study for several years. The ideal weed killer would be one which would eliminate all plant growth except blueberries and kill all weed seeds. The large number of different species competing with the blueberries, the great differences between them and the close relationship between blueberries and some species of competing weeds make the goal look a long way off. The best we can hope for at present is to find materials or methods that will control the more troublesome weeds. Already ways have been found for controlling some of these weed pests. For example, sweet fern (*Comptonia peregrina*) can be controlled by spraying with a dilute solution of 2,4-D during the summer. Likewise, a dilute solution of 2,4,5-T ester sprayed on bayberries during the summer will control it. Many woody weeds can be controlled by spot applications of 2,4,5-T or 2,4-D plus 2,4,5-T esters in oil during the dormant season.

The common brake or bracken (*Pteridium latinsculum*) is extremely troublesome in many areas. The tops are very easily destroyed but the large fleshy root stocks are very difficult to kill. Several materials have been tried but so far only one, polyborchlorate, looks at all promising. To avoid serious injury to the crop this material will have to be applied the year of the burn. However, the exact time of year when application will give best results and the optimum amount to apply have not been fully worked out. It looks as if this material would have the advantage of controlling many other weeds besides bracken.

---J. S. Bailey

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CHEMICAL THINNING OF APPLES

A recent bulletin by Teutner & Murneek from Missouri gives a very fine discussion on how hormones, such as naphthalene acetic acid, are able to thin apples. The authors found that naphthalene acetic acid causes embryo abortion which results in increased fruit drop that produces the thinning effect. Just why the material does not induce embryo abortion in all the fruits is not known at present, although the degree of embryo abortion appears to be related to the stage of embryo development at the time the hormone is applied. In other words, the effectiveness of a thinning spray may depend on the stage of seed development in the young apples at the time of application.

This may or may not account for the differences in the degree of thinning obtained in different seasons from applications with the same timing. Temperatures following bloom could vary enough from year to year so that the stage of embryo development would not be the same each year for the same timing of applications.

Another possible factor for differences in the degree of thinning from year to year may be the effect of weather on the amount of active material absorbed by the foliage following application. Cool, cloudy, damp weather following application may increase absorption and thus increase thinning while warm, bright weather which favors quick drying may reduce the amount of active material which is taken in by the leaves and result in less thinning.

Our recommendations for chemical thinning do not differ materially from those of last year, but we would suggest growers pay more attention to weather conditions when applying the thinning sprays. It appears that we can expect more foliage injury and increased thinning when the thinning sprays are applied under conditions of high relative humidity which favor slow drying. This condition could be favored by sprays applied in late afternoon or evening in contrast to sprays applied earlier in the day.

Our revised thinning circular may be obtained from your County Extension Service Office or direct from the Mailing Room at the University here in Amherst. Ask for Special Circular No. 189, "Chemical Thinning of Apples and Peaches."

---W. D. Weeks

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OBSERVATIONS IN CALIFORNIA

I'm gradually getting to travel with the University of California staff to more and more of their experimental plots and seeing a number of their fruit sections. Since soil and climatic conditions are often much different from those in New England, it is perhaps not surprising that the performance of fruit trees and the methods of orchard management vary considerably from ours. In general throughout the deciduous fruit areas in California, the winters are very mild, by our standards. The lowest minimums in many fruit sections of this state may be above 15° F during the winter. These mild winter temperatures have a profound influence on many species of fruit. Lack of a sufficient number of hours below 40°- 45° F tends to delay the opening of flower and leaf buds so that the bloom period here often extends over a much longer period than ours, even though the late winter and spring days are fairly warm and sunny. Almonds began to bloom in early February, here, but some petals were still hanging on some varieties in mid-March. Peaches reached full bloom around March 16, although some blossoms opened in late February. Sweet cherries haven't opened yet, which is quite a surprise to me, since they bloom ahead of peaches in the East. This difference in time of blooming is apparently related to differences in chilling requirements between the two species. In the Watsonville apple section, the lower limbs are going to flower ahead of those in the tops of trees. Also, in mild winters, many apricot and peach flower buds fall off of some varieties before opening. In the Winters' apricot district, the bud drop is sufficiently heavy in some orchards to reduce the size of the crop this year.

However, in California they have wide variations in summer temperatures from one fruit section to another. In some of the coastal areas, the summer temperatures may rarely go above 85° F. This is the situation in the apple section at Watsonville, whereas, at Davis (an interior area) summer temperatures of 105° are common. Yet,

areas of marked differences in summer temperature may be only short distances apart, and of similar elevation. The sections of high summer temperatures are not suitable for sweet cherries, for example, but may be well suited for peach production. Sweet cherries grown at high summer temperatures may develop as many as 20 to 30 percent double fruits, (hot summers influence development of flower parts) hence they are grown in areas of relatively cool summers.

In the East, every good fruit grower knows he should plant trees on elevated sites to reduce the chances of spring frost damage. In California, relatively little deciduous fruit is grown on hills or slopes. The bulk of it is grown on the flatter, more fertile land. In the Watsonville area, for example, some of the apple orchards are nearly completely surrounded by higher land. The orchards on the slopes and hills are not generally as productive as those on the level land. Orchard heating is a common practice in some fruit areas, but in other places, frost does not seem to be a serious hazard even in what we would consider frost susceptible locations.

As I mentioned last month, deciduous tree fruit yields here are generally very high by our standards. In the Watsonville district, yields of 2,000 bushels per acre are possible. One grower indicated to me that a minimum yield of 700 - 1,000 bushels per acre are needed to stay in business. Although Easterners often don't think of California as an important apple producing state, they produce around nine-million bushels annually. Yellow Newtown, Gravenstein, Red Delicious, Rome, Jonathan, Bellflower and Golden Delicious are the important varieties in the order listed. The bulk of the crop is sold to processors. Red Delicious is the principal variety being planted, however, and it's sold mainly as fresh fruit in California markets.

The apple orchards I've seen here are planted very close together by our standards, and are kept quite low. A planting distance of thirty by twenty-eight feet seem to be quite common in the Watsonville section. The growers use caterpillar tractors and very low air blast sprayers which allow them to snake their way between the rows. Fortunately, for them, scab is usually no problem, and they have no red-banded leaf roller or apple maggot to contend with. However, mildew and mites are real problems, but even so, their spray schedule is much simpler than ours.

---F. W. Southwick

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C. PLANTING STOCK. (Plants set by the nurseryman to produce plants to sell to berry growers as "essentially" virus-free.)

1. Isolate the planting as far as possible from all other strawberries, both cultivated and wild. A distance of 3000 feet is very desirable.
2. The field must have no history of red stele or other soil-borne disease.
3. The plants used should be no more than one year removed from an approved source of Foundation Stock, i.e., should have been grown as outlined under B.
4. The planting (and all nearby strawberry plants) should be protected fully, throughout the season, by dusts or sprays as recommended to control aphids.

D. ADVERTISING AND PROMOTION

1. Plants produced as outlined above should be "essentially" virus-free and should be sold as such.
2. Varieties for which virus-free strains are not available should not be sold as virus-free.

---J. S. Bailey

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HOW TO FIGURE THE AMOUNT OF FERTILIZER TO APPLY

In the past when orchard fertilization was discussed the orchardist heard --- "You should apply so many pounds of ammonium nitrate, urea, 5-10-10 or some other fertilizer". Since there are so many fertilizers now being sold, it is more logical when discussing fertilizer needs to talk in terms of actual nitrogen, potash (K_2O) and phosphoric acid (P_2O_5). It has been noted, however, that this has been confusing to some growers when they try to figure how much of a nitrogenous fertilizer or a "complete" fertilizer should be applied to equal a certain amount of actual nitrogen, potash or phosphoric acid. Therefore, it is hoped that the following discussion will eliminate some of the misunderstanding.

In our fertilizer recommendations we state that a tree capable of producing 25 bushels of apples should receive approximately one pound of actual nitrogen. If we are going to use some common nitrogenous fertilizer how many pounds must be applied to equal a pound of actual nitrogen? To determine this, divide the actual amount of nitrogen needed by the per cent nitrogen in the nitrogenous fertilizer. For example if you are using a nitrogenous fertilizer containing 33 per cent N, divide 1.0 pound by .33 which will give an answer of approximately 3 pounds of the nitrogenous fertilizer that must be applied to be equivalent to 1.0 pound of actual nitrogen.

Similarly, suppose you want to apply 1.5 pounds of actual nitrogen and you are using a nitrogenous fertilizer containing 45 per cent N, divide 1.5 pounds by .45 which will give an answer of approximately 3.3 pounds of the nitrogenous fertilizer to be equivalent to 1.5 pounds of actual nitrogen.

Suppose you are using a 5-10-10 fertilizer, how many pounds must be applied to equal one pound of actual nitrogen? How many pounds of potash and phosphoric acid will be added when enough 5-10-10 is added to equal one pound of actual nitrogen?

A 5-10-10 fertilizer contains an amount of total nitrogen as would be equivalent to five per cent of nitrogen, an amount of available phosphorous equivalent to ten per cent of phosphoric acid and available potash equivalent to ten per cent of potash (K_2O). Since the mixed fertilizer contains an equivalent to five per cent N, divide one pound of actual nitrogen wanted by .05 which will give an answer of 20 pounds of 5-10-10 to add in order to apply one pound of actual nitrogen. If you apply 20 pounds of 5-10-10, two pounds of potash (K_2O) and two pounds of phosphoric acid are added. These answers are obtained by multiplying the 20 pounds of 5-10-10 by the per cent potash and phosphoric acid respectively in the fertilizer.

---W. J. Lord

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HOW TO BORROW MONEY IF YOU NEED IT

Get the Most for Your Money Modern farming requires large amounts of operating credit as well as long-term capital financing.

Buy credit as you buy feed and fertilizer - from dependable sources - at lowest net cost. Be in a position to pay cash for materials bought and demand best prices and services.

Use Farm Account Book Too much credit or credit unsuited to the farm program being financed, can be as detrimental to the farm as no credit at all. Be in a position to determine in advance the money required to carry on your farming business.

Plan for Credit in Advance A sound loan should pay out in profit to you. Estimate your sources of income as a guide to orderly repayment.

There is a very real difference between financing a farm operation and merely making a loan or extending credit for some specific purchase. There is a very real difference, also, between a sound loan and a safe loan. A sound loan must be:

1. A benefit to the borrower and safe for the lender.
2. Adequate but not too much.
3. Available as needed.
4. Liquidated from normal sources with payments geared to income.

Know Where to Borrow Lending institutions are in the specialized business of loaning money. Figure the net cost of the money before you borrow. You may pay anywhere from 4% to 11-1/2% on a "6% interest rate" depending on how the loan is figured.

Get Debts Together in One Place Split credit costs more - limits ability to borrow money - weakens your credit rating, and invites pressure from all creditors. Use regular lending agencies, meet obligations promptly - protect your credit rating in the business community.

Do Not Over-borrow Be sure to keep something in reserve including the ability to borrow more money if needed. Be prepared to meet the unexpected - hospital bills, farm price upsets, crop failures and changing economic conditions. Buy your credit as you now buy feed, fertilizer, spray material, or machinery. Use those agencies which offer the lowest rate consistent with the service rendered. Remember, you are not asking for favors when you apply for a sound loan.

---L. D. Rhoades

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

MAY 15, 1956

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ARE YOU "SELECTING FOR RESISTANCE?"

Reports of recent USDA research emphasize that the ability to "resist" the effects of a miticide is inherited by mites. "Resistance" or the ability to withstand the poisonous effects of pesticides on the part of insects and mites is not new. However, the development of strains tolerant of pesticides never occurred so fast as it has since the introduction of many of our present-day insecticides and miticides. It is cause for thought and planning.

Now, research shows plainly that the ability of mites to withstand the toxic effects of most miticides developed within the last few years is an inherited trait. Furthermore, once a resistant strain is developed, the ability of that strain to withstand the effects of miticides is not likely to be lost. Once a resistant strain of a mite or an insect is developed in an orchard, a potato or vegetable farm, or a greenhouse, the owner has to depend upon biological and climatological factors or wait until a new and superior insecticide or miticide comes along.

For orchardists this report on the inheritance of resistance can be a warning. With strains of mites strongly resistant to phosphates and codling moth strains very resistant to DDT already well established in New York State, it would seem wise for Massachusetts growers to attempt a "delaying action".

For mites this could be using an oil at least once every three years so as to kill red mite in an entirely different way, as compared to the action of the summer or foliage-type miticides. When it comes to fighting yellow mite or 2-spotted mite, do not depend upon phosphates alone. Use phosphates when it is logical to do so because of the presence of aphids or other insects you wish to control. When only mites are the troublesome pests, switch to one or more of the non-phosphate materials and do a "clean-up" job.

When it comes to codling moth, don't be too hasty in your decision to leave lead arsenate out of all the Cover Sprays important for codling moth control. And there may be good reasons for suggesting the use of phosphates against codling moth rather than to depend entirely upon DDT year after year.

---E. H. Wheeler

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CURING MAGNESIUM DEFICIENCY IN CULTIVATED BLUEBERRIES

Magnesium deficiency has not been a common trouble with blueberries in Massachusetts. Since it is not uncommon on other fruits, it would not be surprising if magnesium deficiency occurred more frequently in the future. Experience with blueberries, as well as with other fruits, has shown that heavy applications of potash could bring about magnesium deficiency. As the amount of potash containing fertilizer is increased it would be wise to be on the lookout for this trouble.

Experiments in Massachusetts have shown that magnesium deficiency in blueberries can be corrected by soil application of high magnesium lime or Epsom salts. Depending on acidity a ton to a ton and a half of dolomitic limestone per acre is usually enough. Or one can use 150 pounds of Epsom salts per acre.

There are two other ways by which magnesium deficiency in blueberries might be corrected. Epsom salts might be sprayed on the leaves as is done with apples. A special form of magnesium called chelated (pronounced key-late-ed) magnesium might be applied to the soil. Both of these methods were tried. The results were measured by determining the magnesium content of leaves from treated and untreated plants before and after treatment. The results are given in the following table:

Percent Magnesium in Blueberry Leaves - Dry weight basis						
	Epsom salt Spray	Check	Chelated Magnesium per bush in ounces			
			2	4	8	16
Before	.04	.07	.06	.06	.08	.08
After	.07	.10	.09	.06	.11	.11

The magnesium content of the unsprayed check leaves increased just as much as that of the Epsom salt sprayed leaves. The blueberry leaves are so waxy that it is not surprising the spray applications were not effective.

Chelated compounds are formed by combining a metal, such as iron or magnesium, with an organic compound in such a way that the metal is more readily absorbed by plants. Chelated iron compounds have been very successful in correcting iron deficiency in citrus and some other crops. It seemed that chelated magnesium might be successful in correcting magnesium deficiency in cultivated blueberries. Evidently this is not the case. The data in the table shows that even a pound per bush of chelated magnesium increased the magnesium content of leaves no more than that of unsprayed leaves.

Soil applications of Epsom salts or dolomitic limestone are still the best materials for correcting magnesium deficiency in blueberries.

--- J. S. Bailey and Bertram Gersten

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OBSERVATIONS IN CALIFORNIA

In a state such as California, which produces a wide range of deciduous tree fruit crops under variable soil and climatic conditions, one would expect growers to have a great number of production and marketing problems. One of their common production problems is oversetting of fruit. As you know fruit thinning of apples and peaches are problems of eastern growers. We are attempting to

overcome this difficulty and reduce its cost by the use of suitable thinning sprays. In California excessive sets of apricots, prunes, plums, peaches, apples and olives are common. Hand thinning is an almost industry wide practice and a major production cost. Consequently, experimenters and growers here are quite interested in the possibilities of chemical thinners on all the aforementioned fruits. Almonds, cherries and walnuts are about the only deciduous tree fruit crops which appear to be grown without much concern about oversetting.

Experiments by Drs. Lilleland and Uriu indicate that dinitro materials have considerable promise as fruit thinners on freestone peaches, plums, prunes, and apricots. These fruits blossom over a rather long period but the weather is rarely too poor for good sets and the risk of overthinning, although it may occur occasionally, is not great. There is, also, interest in growth substances such as chloro IPC and Peach Thin 322 (sodium salt of naphthalamic acid for thinning freestone peaches applied at or shortly after bloom. On apples, interest in Amid-Thin is prevalent. Therefore, much experimental work is being done with chemical thinners.

Cling peaches, which are grown in greater volume than freestone, are entirely hand thinned, however. The size requirement for cling peaches is 2-3/8 inches in diameter. There is no premium paid for fruit that are larger than that. The growers objective is to thin just enough so that this size represents about 90 percent of his total tonnage. An average size of 67 mm (2.6 inches) is needed to give 90 percent of the fruit above 2-3/8 inches (61 mm). To thin beyond this requirement results in a loss in total volume with no compensating increase in price for additional size. Dr. L. D. Davis, over a period of years, has developed a method whereby a person, by making a number of fruit size measurements about 10 days after the start of pit hardening (reference date) of cling peaches, can determine about how much thinning must be done so that 90 percent of the crop will be about 2-3/8 inches at harvest time and still get maximum yield. For example, if the fruit averages 32 mm in diameter at reference date heavy thinning will be necessary, if 35 mm moderate thinning and if 38 mm little or no thinning may be needed to result in the desired size at harvest time. Data as to reference date and prevailing sizes at that time are collected in the various cling peach districts through the efforts of State and County workers and passed on to the growers. This, it seems to me, is an unusually precise means of handling the thinning problem. Such precision with chemical thinning procedures is probably unattainable, so for this crop hand thinning is the preferred procedure even though a costly one.

Hormones appear to have real promise in other ways in fruit production, also. For example, Dr. Crane has found that concentrations ranging from 25 - 75 ppm of 2,4,5-T sprayed on apricots at the start of pit hardening have pronounced influence on apricot fruit size and time of maturity. (This is the same material which failed to control our McIntosh drop last fall.) On apricots this material greatly improves fruit size and hastens maturity sufficiently so that treated trees may be harvested a few days to more than a week ahead of unsprayed fruit, depending on the fruit district. This response is highly desirable on apricots since size and earliness are important in the price received for eastern fresh fruit shipments. This material, even though applied many weeks ahead of harvest, controls preharvest drop, also. It's a three-in-one spray for apricots. Since the apricot is a stone fruit you might expect to get the same responses on other stone fruits such as peaches. Unfortunately, the overall response on peaches is

not satisfactory from a commercial standpoint.

In closing you may be interested and amused in knowing that I visited with an apple grower near Placerville this week who had about 10 McIntosh trees which were supposed to be another variety when he planted them. His orchard is in the Sierra foothills at 2,500 - 3,000 feet elevation. He says the McIntosh color well and he seems to like them, but he noted that they are inclined to drop heavily at harvest time.

---F. W. Southwick

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SOIL ANALYSES FOR DETERMINING FERTILIZER NEEDS OF FRUIT TREES

In our talks at fruit grower meetings this past winter, we have stated that leaf analyses are superior to soil analyses in regard to the determination of fertilizer need of fruit trees. In addition, we further stated that the main value of soil tests for orchard soils is for determining lime requirement.

Since our winter fruit meetings, a brief report on the leaf analysis work at the Maryland Experiment Station appeared in a recent issue of the Maryland Fruit Grower. It was stated that, in 1955, leaf samples were obtained from a number of Maryland apple and peach orchards and that at the same time soil samples were obtained under these trees. "Analysis of these leaf and soil samples were made and the degree of correlation studied. It was found that there was no correlation whatever; soil analysis did not, therefore, reflect the levels of the various minerals in the leaves, and cannot be used as a guide for fertilization of fruit trees."

The statement quoted above is further evidence in support of our thought on the value of soil analysis as a guide for fertilizing fruit trees. However, it is again stated that soil analysis is a valuable tool for determining lime requirement and should be used as such at periodic intervals by all fruit growers.

---W. J. Lord

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POMOLOGICAL RESEARCH

12. Apple Orchard Irrigation

Much has to be learned about the irrigation needs of our Massachusetts apple orchards. Although the average yearly rainfall in Massachusetts is approximately 44 inches, many growing seasons there are one to two months when very little rainfall occurs. Unless the moisture holding capacity of the soil is sufficient to carry trees through such periods poor tree growth and fruit development will result. On the other hand, the cost of irrigation equipment is such that the orchardist must be certain as to the need and expected returns on his investment.

A question most frequently asked is, "When should water be applied to orchards?" Proper timing of irrigation as to frequency can save orchardists many dollars.

The electrical resistance method of measuring soil moisture has been developed to such an extent that direct reading moisture meters are available to growers at cost of slightly over \$100. It would be of value to know at what percentage of available soil moisture that irrigation water should be applied.

With the previous statements in mind, it was felt that a research project on apple orchard irrigation would be worth while with the following objectives in mind:

- A - To determine how many years out of ten, apple trees on the experimental site suffer for the lack of water.
- B - To study the effect of water shortage on the growth of apple trees, fruit growth, color, quality and yield of fruit.
- C - To determine at what percentage of available soil moisture irrigation water should be applied.
- D - To find how the nutritional status of the fruit trees is affected by irrigation.

Results of other Irrigation Projects

Under California conditions some research workers have reported that various fruit-crops growing in sandy soils do not suffer from gradual drying of the soil but are able to obtain moisture readily until the permanent wilting percentage of the soil is reached. (Not all moisture in the soil is available to plants. The percentage of water in soil when plants wilt permanently is called the permanent wilting percentage of the soil.) This conclusion was based on yield, growth rate of fruit and fruit size at harvest. On the other hand, the same workers and others have reported the tree size is reduced before the permanent wilting percentage is reached.

In work conducted in Maryland, it was found that growth of apples was not slowed down until soil moisture was near the permanent wilting percentage. During 3 of the 4 years that the experiment was conducted, apple trees on rather shallow shale soil showed reduced fruit growth rate due to moisture shortage at sometime during the growing season. The fruit size was reduced in proportion to the length and duration of the drought. In earlier work other research workers had concluded that there was a slight slowing down of apple growth before the soil reached permanent wilting percentage.

In the Hudson Valley, it was found that fruit size on apple trees planted in a shallow soil decreased when the soil moisture in the top two feet was decreased to the permanent wilting percentage.

In addition to the effect of soil moisture on fruit size and yield, its effect on fruit quality, fruit storage life, flower bud formation, and tree growth has also received considerable attention. It has been reported that differences in soil moisture has no effect on susceptibility of apples to decay, but that irrigated

apples are softer and show greater break down after removal from storage. Other research workers have reported that pears from non-irrigated trees pressure tested higher and had more total solids than those from irrigated trees, but when the fruits were in prime eating condition no difference in texture and flavor could be detected. In Maryland, it was found that when moisture deficiency occurred during the latter part of the growing season there was a reduction in red color development on apples, but in years when soil moisture was ample at harvest time, the non-irrigated trees produced better color fruit than did the irrigated trees. In addition, it was found that when moisture shortage occurred not later than early July, fruit bud formation appeared to be increased. In the same experiment water shortage from late July until fall had no apparent effect on flower bud formation. In greenhouse studies conducted in Michigan, it was found that utilization of 80% or more of the available soil moisture significantly reduced total chlorophyll per apple tree, shoot growth, trunk diameter increase, dry weight increase, and leaf area.

Present Outlook

This brief review summarizes a few of the studies previously conducted on the soil moisture relationships of fruit trees. Experimental results have shown that growth of apples was not reduced until soil moisture was near or at permanent wilting. In other words the growth of apples was not reduced until the tree roots had used most of the available moisture in the soil. On the other hand, the growth of the fruit trees was affected prior to the depletion of available soil moisture.

At present, little is known about the irrigation needs of Massachusetts orchards. How many years out of ten would irrigation pay? Even though fruit size and yield might not be affected by a deficiency of soil moisture, tree growth may be significantly reduced and thereby have an adverse influence on subsequent crops. This can be determined only by a long term irrigation project such as is being planned.

Nutritional status, particularly nitrogen level, influences color, keeping qualities of apples and fruit development and also might control fruit quality to a greater extent than soil moisture. This project should enable us to find out the nutritional status of the irrigated and non-irrigated trees and should determine if part of the effects of irrigation on fruit quality can be contributed to nutrition.

One of the most difficult problems in connection with irrigation is to determine when irrigation water should be applied in the orchard. It is hoped that the data obtained from the periodic soil moisture readings and fruit growth measurements will give us an index as to when trees need irrigation.

---W. J. Lord

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WHEN DO APPLES REQUIRE THINNING?

A mature apple tree may have 30,000 to 50,000 blossoms. If it were possible for all of these blossoms to set fruit, and to mature to an average size of 150 apples per box, there would be a crop of 200 to 333 boxes per tree. We all know

that such yields are not possible, but just how many blossoms should set to give us a reasonable yield of good sized fruit? Twenty six hundred apples will produce 20 boxes of fruit with an average size of 130 apples per box. In general, 3 to 8 per cent of the total blossoms are all that are required for a satisfactory crop. Of course, the set required for a satisfactory crop depends on the extent of bloom, a variety such as Early McIntosh which has abundant bloom requires less set for a crop than McIntosh which usually has a moderate bloom.

In our chemical thinning studies we express fruit set as the number of fruits for each 100 blossoming clusters. From these studies we have determined for several of our commercial varieties the fruit set necessary for a satisfactory crop when they have a full bloom. The following figures listed for each variety indicate the number of fruits for each 100 blossoming clusters which will produce a satisfactory crop:

	<u>Fruits per 100 blossoming clusters</u>
Wealthy	15-20
Early McIntosh	15-20
McIntosh	25-30
Baldwin	20-25
Golden Delicious	25-30
Delicious	25-30
Macoun	15-20
R. I. Greening	20-25

These figures may help in determining whether or not to thin a block of trees. If it is quite apparent that the final set will exceed these figures by a wide margin then a chemical thinning spray may be desirable. Varieties which set large crops, such as Early McIntosh and Wealthy, can usually be depended upon to exceed the set figures given and to require thinning. McIntosh and Delicious may or may not require thinning. It is often difficult to determine whether or not these varieties need to be thinned. By marking a few limbs and counting the number of blossom clusters and developing fruits, a grower may be able to determine to some degree what the final fruit set will be. This procedure should aid the grower in his decision to thin or not to thin.

---W. D. Weeks

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DATES TO REMEMBER

June 18 (Monday) 7:00 PM

Strawberry Twilight Meeting at University of Massachusetts, Amherst.

Inspection of new varieties and discussion of strawberry growing problems.

July 19 (Thursday) all day.

Orchard Day Program at the University of Massachusetts, Amherst

Exhibits and demonstrations of orchard equipment during forenoon: Speaking program on several aspects of fruit marketing in the afternoon.

---A. P. French

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SHOREHAM COOPERATIVE COLD STORAGE

The following is a talk presented by Tom Cook of Burlington, Vermont and the Shoreham (Vermont) Cooperative to the Franklin County Fruit Growers at a meeting held in Ashfield on March 1, 1956. The general topic was requested by the county fruit commodity committee in a program planning meeting during the fall of 1955.

"I am very pleased to have the opportunity to talk with you fellow fruit growers today about our experiences with a Cooperative Cold Storage at Shoreham, Vermont. And out of it I hope that you will get encouragement to go ahead with one of your own because it will not only help you, but it will help us. I firmly believe that if we here in the northeast could market our apple crop through a few large cooperatives that we could do a more orderly job, put better fruit on the market, give the consumer a better value and have more money left for ourselves. This year's market has been an example of what happens when a lot of individuals try to sell a few more apples than the markets will easily absorb.

So much for philosophy. Now to get down to practical experience. I am going to be extremely frank in reciting our experiences and tell you the things we did wrong as well as those we did right. I hope that you will feel free to interrupt me at any time that you have questions. I would much rather talk with you than at you.

During the fall and winter of '45-'46 we did a lot of talking about a cooperative cold storage plant, including a visit to Myron Lord, Kezar Falls, Maine and in April 1946 we finally incorporated and started building our plant. There were only five of us in the original organization and since our bylaws called for five directors, we had no problem with elections.

Our first big problem was raising enough money to build with. We did this through sale of common stock to members and preferred stock to members and friends and borrowing the limit from the bank for cooperatives. I would like to read the section of the bylaws on these stocks because I think we have some pretty good safeguards in them.

We also use the common stock as means of allocating space in the storage. The original membership of five has increased to nine.

Our original plant had a capacity of 34,000 bushels. We have since added four controlled atmosphere rooms, one a year, with a capacity of 11,000 bushels each. In each case members have bought common stock, we have used some of the storage surplus and borrowed the balance. Our financial statement as of June 30, 1955 shows our present position.

The benefits we have derived from the Cooperative as I see them are:

1. Help at harvesting. We pick orchard run and ship to the storage as soon as possible.
2. This fast movement to storage helps keep quality up.

3. The apples are packed as they are sold throughout the season. This assures a fresh pack of the kind and type that is moving best at the time.
4. We are now packing between 150,000 and 200,000 bushels of apples a year. This is a large enough volume of uniform high quality pack to make a name on the market and sometimes command a premium.
5. The controlled atmosphere rooms have gotten us a superior price for part of our crop each year and have extended the Mac packing and marketing season.
6. We have sold through one commission.
7. Each member's apples keep their identity until sold. We have not tried pooling, but all are sold under the Cooperative's label.
8. Packing charges are on an actual cost-plus basis for each individual lot of fruit and average around 25¢ per box.

We still have some problems or you might call it unfinished business. We have not developed profitable outlet for our second grade fruit. We have not cashed in on the local market.

We have been expanding rather rapidly so have not reduced our debt as much as we might have. (I am not sure that this is bad.) Our original building was built during the war when materials and labor were scarce. We built it ourselves with hired labor. We saved some money, but we now have some extensive repairs to make.

Also, we have taken apples from non-member growers during light crop years in order to operate the storage efficiently and now are faced during a heavy crop year with too much fruit.

I have some of the returns from my apples and one other member that may help give you an idea what our expenses and returns have been. What we have left is the thing we are most interested in.

(Ed. Note: These figures were presented to the meeting, but are not available here. Mr. Cook might be willing to present them personally to interested parties.)

Come up and see our plant in operation and talk with:

Wm. Stalker, Jr., Manager Telephone - Shoreham 42

SCAPA

Shoreham, Vermont

Residence: Middlebury, Vermont"

J. T. Thayer

Associate County Agricultural
Agent Franklin County

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FRUIT TREE SURVEY COMING UP

The February issue of Fruit Notes contained the initial announcement of a fruit tree survey this summer initiated by the Fruit Industry Committee of the Massachusetts Fruit Growers' Association and to be conducted by fruit growers with the assistance of the Cooperative Extension Services. A sample form of the questionnaire to be used was included and you were urged to obtain the information asked for.

At a meeting of the Fruit Industry Committee May 3rd it was decided to conduct the survey between June 25th and July 7th.

Prior to June 25th a copy of the official questionnaire will be mailed to each known fruit grower having 100 or more trees of either apple, peach or pear. You are urged to fill out this questionnaire to the best of your ability and some individual will be assigned to give any assistance that may be necessary and pick up the questionnaire when completed. Do not mail it but hold it until it is collected by an enumerator.

This survey will be of value to you as follows:

1. It will tell you the number of trees of each important variety now grown in the state and thus guide you in the selection of varieties for future planting.
2. It will tell you not only the number of trees of each variety but the number of non-bearing, in their prime and reaching old age.
3. It will tell you the number of trees of new varieties that have been planted.
4. It will tell you the capacity of farm operated refrigerated storages in Massachusetts.
5. It will tell you what percent of the apple crop is sold on roadside stands, direct to retail stores, to other selling agencies and for cider.
6. It will indicate trends in the tree fruit industry and guide you in adjusting your business accordingly.
7. It will enable the Extension Specialists to study the significance of changes occurring in the fruit industry and thereby help them to serve you more effectively in recommending ways in which you can make adjustments.

This is a cooperative effort of fruit growers to help themselves. You can help by supplying the information requested in the questionnaire.

---O. C. Roberts

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UNUSUAL TYPE OF WINTER INJURY

An unusual and severe type of winter injury to the trunks and lower scaffold limbs of bearing apple trees was recently found in three apple orchards in Middlesex County. How prevalent the injury is throughout the state is yet to be determined.

The bark on the injured tree trunk is in some instances split but more generally just pulled away from the wood. Although the injury is more predominant on the south side of the tree, no side is immune. In addition to the trunk, this injury frequently extends a considerable distance up on the lower side of many of the scaffold branches.

The result of rather limited observations reveal that the winter injury is mainly confined to bearing McIntosh trees. Baldwins, Delicious, Cortlands and except for an occasional Northern Spy and Early McIntosh show no injury. It bears repeating, that these statements are based on limited observations. It is of interest to note that two of the orchards have peach trees and that the fruit buds came through with little killing.

The orchard in which the winter injury was first discovered was one in which a fertilization experiment has been conducted since 1949, therefore, the 1955 nutritional status and yields for 110 trees in the orchards are known. Although nutritional level of the trees varied considerably and the 1955 crop varied on the trees, there was no correlation between yield or nutrition and winter injury.

The winter injury was not confined to a particular area in the orchards but appeared to be scattered throughout. However, in the areas having injured trees, practically every tree in that area was injured.

It is known that if the loose bark on winter injured trees is alive and is tacked down it will often re-unite with the trunk. It was suggested to the grower in the orchard where the winter injury was first discovered, that he try a "gun" stapler instead of using a hammer and tacks. Nine-sixteenth inch staples were tried and apparently does a satisfactory job. This method of tacking the bark is more rapid and less tiring than the usual method of tacking. After tacking the bark, it is suggested that the injured area should be covered with grafting compound.

---W. J. Lord

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BIRD DAMAGE TO FRUIT CROPS

The amount of damage done by birds on certain fruit crops in Massachusetts has apparently been increasing materially in recent years. Grapes, blueberries, and cherries have been particularly hard hit. However, strawberries, raspberries and even peaches and early apples have been damaged more or less severely in many areas.

At least several species of birds have been observed doing damage. Starlings seem to be the most general offenders, but grackles, robins and catbirds take their toll. Even orioles as well as some of the smaller birds are known or strongly suspected of damaging certain crops. Through a research project recently initiated

at the Agricultural Experiment Station under the leadership of Dr. R. E. Trippensee of Wild Life, as well as through the efforts of the Massachusetts Audubon Society it is anticipated that more exact information will become available concerning the species of birds involved. Research on control methods will be the next step in solving this complex and exasperating problem.

Control methods currently available appear to be limited chiefly to two types: (1) screening and (2) noise makers. Screening, particularly with second hand tobacco cloth, cheese cloth or similar material is probably the most satisfactory method for the home gardener to employ. Protection will probably be more complete if the screening does not touch any of the ripening fruit. Birds will peck through and may soon open holes large enough to gain entrance where the screening is touching or very close to the fruit.

For the commercial grower two types of noise makers will be available this summer, both of which have been found to be quite satisfactory against starlings and moderately so against grackles and robins.

1. Firecrackers. Work in several northeastern states has indicated the usefulness of firecrackers attached to slow burning fuse-rope. The preparation and use of the rope firecracker device is described in Wild Life Leaflet #365 issued by the U. S. Fish and Wild Life Service and may be obtained from any office of that service. The bill sponsored by the Massachusetts Farm Bureau, the Massachusetts Fruit Growers' Association and other organizations to permit the use of firecrackers for the protection of farm crops has been passed by the General Court, signed by the Governor and we understand it is to become effective about the middle of June. Mr. Wesley Jones, U. S. Fish and Wild Life Service, Amherst plans to issue a release to County Agents soon. In the meantime it is quite certain that a permit will have to be obtained from your local Fire Chief before you can purchase firecrackers even for such farm use and remember firecrackers are dangerous explosives to handle and store on the farm.

2. Carbide Exploders. Noise makers which operate on gas generated by the action of water on calcium carbide have been on the market for many years. Most of them have a single explosion chamber, however, a very few have two non-synchronized explosion chambers. In limited tests made at the University last summer the non-synchronized double-chamber type of carbide exploder gave the best control of birds in cherries and blueberries. As a matter of fact 1955 was the first time for many years that we were able to harvest any ripe sweet cherries for class use without the use of tobacco cloth cages.

Unfortunately most of these carbide exploders cost from \$50. to \$75. each and in an orchard will probably not be effective over an area of more than one to two acres. Rather regular cleaning and a little adjusting is necessary to keep them in operation. However, the cost of carbide on which to operate is only about 50¢ per day or about one-third the cost of firecrackers to do the same job.

With either type of noise making it is important to have the device in operation early and late as well as during the normal working hours. Birds recognize nothing less than a dawn to dusk day.

Information on sources of equipment and supplies for noise making devices may be had from your County Agricultural Agent or the Department of Pomology, University of Massachusetts, Amherst.

---A. P. French

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APPLE POWDERY MILDEW

Trouble from apple powdery mildew was anticipated for Massachusetts growers two years ago. Growers were warned that it was causing concern in the states to the south and west of us and it would only be a matter of time when it would be troublesome in Massachusetts too. Therefore, it is no surprise to find it starting in three Massachusetts orchards this spring.

The Agricultural Research Service of the United States Department of Agriculture states in a recent report, "Apple powdery mildew, spreading rapidly in the past few years, has become a troublesome disease in apple orchards east of the Mississippi River". At present it is not serious in Massachusetts but it may, and probably will be, if growers are not on guard against it, and if they do not take prompt measures to control it when it is found in an orchard.

Apple Powdery Mildew is Not New

We have always had a little powdery mildew in our orchards, and frequently it was brought in on young apple nursery stock when a new orchard was planted. It caused little concern because the mildew was held in check by the sulfur and lime-sulfur which growers were using for control of apple scab and sulfur is one of the few fungicides that controls mildew.

In recent years, grower preference has been for organic fungicides rather than sulfur because they control apple scab better. As frequently happens, when one changes to new materials to get better control of one disease problem, another is created. The organic fungicides do not control apple powdery mildew and now this disease is on the increase and promises to be a major problem in fruit growing in Massachusetts.

How the Fungus Attacks

The powdery mildew fungus is an obligate parasite - it must have living apple tissue on which to live. It first appears on a tree as a powdery white growth on the leaves and then creeps down onto the soft shoots and twigs and into the buds. If it starts early in the season, there may be considerable distortion and stunting of the leaves and shoots. On the fruit it causes a network of russet and, in severe cases, stunting, shriveling, and cracking. The fungus continues to grow and spreads by spores produced on the mildew mat and which are blown about by wind and carried by air currents to other leaves and other trees until mid-summer.

The powdery mildew overwinters on the twigs and in the buds on infested twigs. The buds are weakened by the invading fungus and are less resistant to winter cold than healthy buds. They are frequently killed by temperatures 20-30° F. below zero as are also some of the infected twigs. Temperatures slightly below zero do not seem to be effective in wholesale eradication of the fungus. Unless the infected overwintering buds are killed by cold, they are the source of infection for new leaves in spring. If the season is early, the mildew may show up between delayed dormant and pre-pink but this year, since the season is late, it may not show up until pink or later.

Susceptibility of Apple Varieties

No variety of apple is immune to powdery mildew but some are more susceptible than others and a few are highly resistant.

Relatively resistant varieties are McIntosh, Delicious, and Golden Delicious. Very susceptible are Baldwin, Cortland, Gravenstein, Rome, Jonathan, Stayman, and Yellow Transparent.

Suggestions for Control

Best results are obtained when cultural practices, mechanical means, and chemical treatments are used together.

- (1) Buy and plant only nursery trees that are free from mildew. The nurseryman should control diseases in the nursery before he sells the trees to you.
- (2) Prune out all infected terminals during winter pruning and newly infected terminals in summer as far as is practical. This will help keep the fungus from building up. There is no need to burn the prunings since the fungus will die as soon as the pruned twigs die.
- (3) Spray: There are two materials that will control mildew - sulfur and karathane or mildex. Sulfur is a little less expensive and is quite satisfactory in the pre-bloom sprays on varieties that are not sensitive to sulfur. Injury may result if temperatures are 85° F. or higher after application. Three pounds in 100 gallons is sufficient.

Karathane is a little more expensive and is preferred in pre-bloom sprays on sulfur sensitive varieties and in the cover sprays on all varieties. It may cause injury when temperatures are 95° F. or higher for prolonged periods. It will cause injury with oil and oil-containing formulations and may cause injury when combined with organic phosphate insecticides especially during the calyx to second cover period. Otherwise karathane is compatible with the common fungicides and insecticides. It even has some miticidal value and will aid in mite control. It is used at 1 lb. per 100 gallons for the best mildew control.

The following points about spraying should be kept in mind.

- (1) Start control immediately when mildew is found in an orchard.
- (2) Where mildew was present the previous year, begin control before bloom and continue during the cover periods to avoid build-up in the buds and winter carry-over.
- (3) Spray thoroughly so that the mildew is wet by the spray.
- (4) Use a wetting agent to get good wetting of the fungus. Some fungicides, like glyodin, already have enough wetting agent for this purpose.

---O. J. Gilgut

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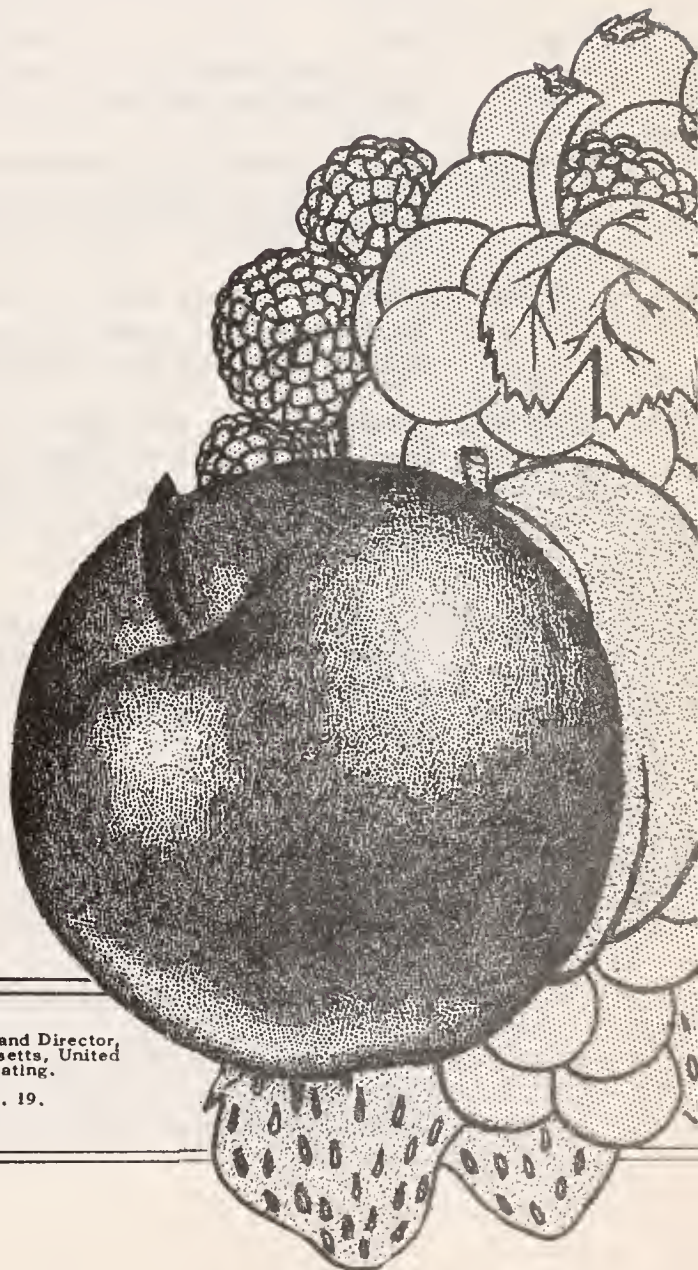
FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

JUNE - JULY - 1956

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POMOLOGICAL RESEARCH

13. Chemical Control of Weeds in Fruit Plantings

The use of chemicals to control weeds is not new. Such ordinary materials as salt and smelter wastes have been used for centuries. The modern era of chemical weed control began with the accidental discovery of the selective action of copper salts in 1896. During the period from 1900 to World War II a considerable list of weed killing chemicals was developed. Some were selective, some were non-selective and a few could be used as soil sterilants. Large quantities of a few of these were used for specific purposes, mostly in the western states.

With the entry of the United States into World War II and the consequent shortage of labor, chemical weed control began to receive more attention as a labor saving device. The introduction of 2,4-D with all the possibilities it presented stirred the imagination of manufacturers, researchers, farmers and other users. The public press and trade papers kept before consumers a rosy picture of the performance of this "miracle" weed killer.

Although 2,4-D has not solved all weed troubles, it is a very useful material where it is adapted. It also focused attention on the possibilities of a much wider use of chemicals for weed control. The result has been a deluge of new chemicals with supposed weed killing potentials. Many of these were distributed to researchers before their real value was known. Therefore, the researcher was faced with the task of "weeding" the weed killers. Among so many herbicides there certainly should be some that could be used to advantage in fruit plantings.

One of the first to be used in orchards was sodium chlorate, formulated to reduce fire hazard, to control poison ivy. This was largely replaced by ammonium sulfamate (Ammate). More recently 2,4-D, 2,4,5-T, and mixtures of the two have come into wide use. Directions for poison ivy control are in Special Circular 190, Poison Ivy. These materials are being used also for the control of brush around orchards. The control of chokecherries, a menace to nearby peach orchards, is discussed in Special Circular 216, Chokecherries: How to Recognize and Get Rid of Them.

Soon after the introduction of 2,4-D it was found that strawberry plants would tolerate more than many of the weeds associated with them. The optimism generated was short-lived. Although the strawberry plants themselves would tolerate 2,4-D applications, runner and fruit bud formation and fruit growth were adversely affected. Hence, 2,4-D's usefulness in strawberry fields is so limited it is not included in our chemical weed control recommendations for this fruit. Numerous other materials have been tried but only two are recommended, SES for control of summer weeds and CIPC for winter weeds, especially chickweed. Consult Special Circular 215, Chemical Weed Control in Strawberries, for details.

Mature raspberry canes are fairly resistant to 2,4-D which can be used at 1-1/2 pounds amine form per acre to control broad leaf weeds after suckers are two feet high. SES will delay the reappearance of weeds when applied at 3-4 pounds per acre to a weed-free field. CIPC at 6-8 pounds per acre applied from mid-October to mid-November will control winter weeds. Two applications a month apart may be made if necessary. Except during suckering DNBP may be used at 3 pounds per acre

for temporary control of grasses.

Grapes can be weeded with a directed spray of DN+oil provided it does not hit tender new shoots. Two quarts of Dow General or Sinox W with 15 gallons of fuel oil and 85 gallons of water can be used as needed in established vineyards.

The list of herbicides for cultivated blueberries is still short. DN at 3-4 pounds per acre will give temporary control of weeds during summer and fall but must be kept off tender new shoots. In clean cultivated fields a pre-emergence application of SES at 3 pounds per acre may be helpful.

Because of the provision of the Miller Bill and the lack of clearance on several materials, the list of herbicides that can be recommended in fruit plantings at present is rather limited. As the 1956 season progresses and more information required under the Miller Bill becomes available, more herbicides will be given clearance for use. Even when all those known to be useful have been cleared, not all weed problems in fruit plantings will be solved. There is need for a better material for control of summer weeds in strawberries. Grasses, especially witch grass, can be a very trying problem where cultivation is undesirable or impossible. Under these conditions no fully satisfactory control is available.

---J. S. Bailey

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A NEW BLUEBERRY DISEASE

What appears to be a new disease of the cultivated blueberry was found in a field in Freetown, Massachusetts, in the spring of 1955. Affected bushes may have galls on all woody portions, both tops and roots. The galls on the top portion of infected bushes closely resemble the galls of the crown gall disease. The striking difference is the appearance of gall on the root of the plants infected with this new disease. Root galls have never been observed on crown gall infected cultivated blueberries.

This root gall disease appears to be infectious but the causal organism is not known. Work is under way to determine the cause and methods of control.

Root gall disease has been found in only the one field. If anyone finds blueberry plants with galls on the roots, the authors would like to know about it.

---B. M. Zuckerman and J. S. Bailey

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LEGAL LIABILITY RISKS AND INSURANCE PROTECTION FOR FARMERS

A farmer runs a greater risk now than ever before of becoming involved in a lawsuit, because of injury or death to another person. Power machinery has increased rapidly on farms and has been accompanied by an increase in accidents. More cars and trucks on farms, the need to go more frequently to town on business, increase your chances as a farmer of becoming a party to a traffic accident. Farmers' net worth has increased so farmers stand to lose more today if called into court. A court judgment could mean the loss of lifetime savings.

Liability insurance, therefore, is more necessary to a farmer than ever before. In general, the legal liability risks a farmer runs, by virtue of being in business, fall into three groups (1) personal liability, (2) liability to employees, and (3) motor vehicle liability.

(1) Personal Liability of Farmers

As an owner or occupier of property, a farmer must maintain his holdings with due regard to the safety of others. This duty applies particularly to the upkeep of buildings, in the control of his livestock on the farm, in the wholesomeness of the products he sells, as well as to work undertaken by him both on and off the farm.

Under personal liability, a farmer is responsible, among other things, for the following:

1. To safeguard visitors on his premises. (His highest responsibility is to those he directly or indirectly invites to his place; he is less responsible for licensees, such as salesmen; and he owes trespassers at least the duty of not knowingly harming them.)

2. To keep his livestock off highways where they may cause accidents resulting in injury to motorists or to property.

3. To provide safeguards in handling vicious animals.

4. To warn his tenant of any hazard on the premises that would not ordinarily be detected.

5. To prevent fire from spreading from his property to the premises of another.

6. For his own negligence if an employee is injured while at work.

7. To his own employees and, under certain circumstances, those of a contractor doing work on his farm, even though the contractor might carry insurance.

Two Types of Personal Liability Insurance Policies

There are two types of personal liability insurance policies available to farmers:

1. The Owners, Landlords, and Tenants (OL & T) form which may or may not include the Employers Liability-Farm Employees coverage, and

2. The Farmer's Comprehensive Personal Liability (FCPL) form.

An OL & T policy covers the farmer's legal liability to the public while on his premises. Coverage may be extended to cover liability to farm employees by including Employers Liability-Farm Employees coverage.

A Farmer's Comprehensive Personal Liability (FCPL) policy covers or may be written to cover:

1. Protection to the farmer against suits brought by others for bodily injury or property damage.

2. Protection from suit by a consumer who bought the farmer's product through a second party.

3. Provides medical payments to injured persons without regard to whether the farmer is legally liable.

4. Provides protection against suit that results from injuries caused by automobiles used on the farm that are not licensed for highway use.

5. Provides coverage for liability involved in any written lease between tenant and landlord if acceptable to the company.

6. May cover liability from custom work which a farmer does.

7. May be written to provide protection against lawsuits by injured employees, as well as medical benefit payments to them if not covered under State Workmen's Compensation.

8. May include medical payments to neighbors who do odd jobs on swap labor basis.

Rates depend on policy, coverage risk and in case of FCPL policy on size of farm.

No. 1 of a series

---L. D. Rhoades

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MULCH FOR GRAPES

The following are excerpts from Research Circular #28 published by the Ohio Agricultural Experiment Station entitled "Mulch as a Management System for Grapes".

In the experimental vineyard located at Wooster, Ohio, "Concord grapes were grown for nine years under permanent straw mulch and cultivation plus cover crop systems of soil management with different rates of nitrogen fertilizer application. The vigor of the vines as evidenced by pruning weights in 1952 and 1953 was significantly higher under the mulch system of management. Mulched vines produced on the average 16.9 lbs. of fruit per vine per year as compared with 11.4 lbs. per vine per year from the cultivated vines. The petiole concentrations of nitrogen, phosphorus, potassium and manganese were higher while calcium and magnesium were lower under the mulch system of management. Highest total yields under cultivation occurred when 80 lbs. per acre of actual nitrogen was applied each year. With mulch the highest total yield for the period 1947 through 1953 occurred where 40 lbs. actual nitrogen per acre per year was applied. It should be noted, however, that in 1953 highest yields with mulch occurred when no nitrogen was applied and this has continued to be the case in 1954 and 1955.

The use of mulch resulted in the production of fruit containing lower soluble solids and higher acids than did cultivation. The influence of season on these constituents was nearly as great as was the influence of soil management system. The reduction in soluble solids under mulch is believed to be the result of delayed maturity and might be overcome by permitting a longer ripening period.

During the first several years while a mulch is being established, applications of 40 pounds of actual nitrogen per acre per year are recommended. With the rate and kind of mulch used in this study such applications of nitrogen were beneficial for the first six years of production. This period would vary with different kinds of mulch material. Sawdust, for example, would decompose less readily and might require prolonged applications of nitrogen, whereas more rapidly decomposing materials which were relatively high in nitrogen might require less than six years of nitrogen fertilizer application.

The use of permanent mulch system of management for Concord grapes is believed to be economically sound and to possess certain advantages not obtainable under the conventional cultivation plus cover crop soil management system."

Editor's Notes:

In the Ohio Experiment the mulch was applied originally at the rate of 10 tons per acre and was replenished annually to maintain a layer of straw from 10 to 12 inches in depth. In our mulching experiments with raspberries conducted at Amherst hay mulch was applied at the rate of 20 tons per acre in order to have sufficient mulch to suppress weed and grass growth. This amount of hay gave a mulch covering of 4 to 6 inches deep.

As was stated in the excerpts from the Research Circular, the rate of fertilization will vary considerable with the mulch used. Most hay would probably be higher in nitrogen than straw and will decompose more rapidly. It is known that nitrogen deficiency may develop if appreciable amounts of carbonaceous organic materials such as sawdust are used as mulch. This deficiency develops because the bacteria which decompose the organic matter tie up the soil nitrogen in an unavailable form.

Grape growers in Massachusetts who might want to try the mulch system for growing grapes will have to adjust their fertilizer program according to the amount and kind of mulch applied and to observations of plant response.

Because of our short growing season the delay in ripening caused by the mulch system might be very serious on Concord and other varieties ripening with or later than it.

---W. J. Lord

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EFFECT OF FROST UPON THE VIABILITY OF APPLE POLLEN

Some fruit growers have wondered about the effect of the recent frost upon the viability of apple pollen. The amount of injury to apple pollen at a given low temperature depends upon the variety and the condition of the bloom at the time the frost occurred. It is generally stated that considerable pollen is still viable at temperatures which kill the styles and stigmas.

In a paper published in the Proceedings of the American Society of the Horticultural Science in 1930, W. E. Lommel and Laurenz Green reported on the effects of frost upon the viability of apple pollen. The following are some excerpts from that article. The minimum temperature was not known but "a relatively heavy freeze occurred in the orchard where the apple trees were in varying stages of blossoming, ranging from 40 per cent full bloom in the case of Rome Beauty to 90 per cent with Delicious. Considerable damage was done to the blossoms of which a considerable percentage were killed. Later many frost bands developed on the fruits.

Pollen was taken from blossoms and buds at various stages of development and showing different amounts of pistil and stamen injuries. The pollen was thoroughly dried in the laboratory and germination tests were made in a 10 per cent sugar solution, 11 and 12 days after the freeze.

Unopened buds showing no pistil injury gave a high percentage of viable pollen in all varieties except Stayman Winesap. Stayman Winesap produced practically no viable pollen in any case.

Unopened buds with dead pistils yielded high percentages of viable pollen in Delicious, Grimes Golden, and Jonathan. Rome Beauty in this class showed less than 40 per cent viable pollen. Unopened buds of Delicious with dead pistils and brown anthers and filaments gave a high percentage of germinating pollen. Jonathan pollen from blossoms of the same class contained only an occasional grain of germinating pollen and all of these were low in vigor.

Delicious was the only variety that produced even a fair percentage of viable pollen from opened blossoms with dead pistils. Delicious pollen was injured very little at the temperatures experienced even when the anthers and filaments were killed. Stayman Winesap produced practically no viable pollen even in uninjured

blossoms. Rome Beauty pollen was apparently injured to a greater extent by the cold than that of the other varieties."

---W. J. Lord

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WATER SPRINKLING FOR FROST PREVENTION

Some fruit growers sprayed water on their apple trees with their orchard sprayers in an attempt to prevent frost injury. In one orchard where this was done, the writer observed that the blossoms were injured more on the sprayed trees than on unsprayed trees. In addition, considerable foliage injury occurred on the sprayed trees.

Water must be sprayed on the trees continuously as would be applied by an oscillating type sprinkler to provide enough heat to keep the plant from freezing. With orchard spray equipment it would be very difficult to supply continuous water. The following paragraphs were written by Dr. W. D. Weeks and appear in Special Circular #134 titled "Frost Prevention for the Orchard".

Sprinkling plants with water during a frost has long been considered as a possible method of preventing injury. There have been reports of both success and failure where this has been done.

The underlying principle by which water is able to prevent frost injury is based on the latent heat which is released when water is changed to ice. Some heat is released as water is cooled to 32°F., but the main effect is produced when the water is changed to ice. When 1000 gallons of water are changed to ice as much heat is released as when 800 gallons of boiling water is cooled to 32°F. The temperature of any object remains near 32°F. so long as water is freezing on it. Fruit blossoms are not critically injured by temperatures of 30° to 32°F. so if they can be kept at temperatures of 30° to 32°F., even though encased in ice, frost injury can be prevented.

It is quite obvious that frost protection by water sprinkling depends upon an adequate supply of water and equipment which can apply the water during the period of frost. Overhead irrigation equipment of the oscillating type may be adapted for frost protection. It must be capable of operating without clogging with ice and of applying the required amount of water continuously. The amount of water to apply depends on the severity of the frost. In one experiment conducted in England, 1/10 inch of water per hour was able to give protection for about 8°F. of frost.

Water should be applied just as soon as the air temperature reaches 32° and should be applied continuously just as long as the air temperature remains below freezing. If sprinkling stops before thawing takes place, the temperature of the wet flower drops rapidly and it is killed.

Water sprinkling as a method of frost protection for the average Massachusetts orchardist does not appear to be too practical. It will require considerable

additional expense for equipment to apply the water, and the possibility of extensive limb breakage from ice-laden branches could easily offset any benefits from decreased frost injury."

---W. J. Lord

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FOOD FOR THOUGHT

"The following, it seems to me, are some of the important matters which ought to claim the attention of every fruit grower in New England.

1. First and foremost, we ought to do everything in our power to insure a good crop of good fruit.
2. We ought to have better quality varieties.
3. We ought to support in every way possible, the movement for uniform legislation governing the packing and selling of apples.
4. We ought to advertise.
5. We must cooperate in every way possible.
6. We must develop more satisfactory packages.
7. And lastly, we must pay more attention to our retail markets."

The platform or program quoted above certainly highlights the current emphasis on improved marketing as the greatest need of the Massachusetts fruit industry today. Yet, dear reader, that program is taken from an address given by Professor Fred C. Sears as President of the Massachusetts Fruit Growers' Association in 1915. Certainly, we have made much progress in marketing as well as other problems of the fruit industry in the past 40 years. However, there is still much to be done all along the line from the grower to the retailer to raise the standard of fruit, apples in particular, which is offered the consumer.

The future of the Massachusetts fruit industry is at stake even more today than it was in 1915. The action of growers, individually and collectively, now can set the stage for greater acceptance of our attractive, juicy, and aromatic New England grown fruit throughout a larger marketing area.

---A. P. French

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WINTER HARDINESS OF RASPBERRY VARIETIES

The winter of 1955-56 was one during which the ground was bare and frozen much of the time. With the exception of two nights in December when the temperature went to -10° F. and -15° F., no severe cold prevailed. Yet this combination of circumstances was sufficient to cause considerable winter killing of canes of many varieties of red raspberry.

The listing below gives an estimate of the percentage of total cane length of each variety that was found to be dead in the University variety planting after growth had started this spring. For purposes of comparison, an estimate of winter killing during the winter of 1954-55 is listed in parentheses.

Chief	0%	(5%)	September	45%	(40%)
Latham	5%	(10%)	Muskoka	50%	
Madawaska	10%	(10%)	Marcy	50%	
Sunrise	15%	(25%)	Gatineau	55%	(25%)
Early Red	25%	(35%)	Cuthbert	70%	(50%)
Viking	30%	(60%)	Willamette	75%	(60%)
Milton	30%	(40%)	Amber	75%	(75%)
Puyallup	40%				

It is unfortunate that so few of the newer varieties stand our winter anywhere near as well as does the old standby Latham.

---J. F. Anderson

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POMOLOGICAL PARAGRAPH

Winter Injury

The winter injury described in the May issue of "Fruit Notes" has been reported in other orchards. In most instances, however, it is less extensive than in the first orchard in which it was observed by the writer. In most of the orchards the injury appears to be correlated with early pruning.

---Editor

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OBSERVATIONS IN CALIFORNIA

The growing season out here is pretty well advanced now. Hand thinning of most fruit crops has been completed or is about over. Sweet cherries are being picked now (middle to latter part of May) and some are being packed for eastern shipment. Packing of sweet cherries is strictly a hand operation and it seemed to me that this job requires considerable skill. The cherries are packed in rows with the same number of cherries in each row.

I was surprised to find that growers are interested in the possibilities of chemical thinners for sweet cherries. A premium is paid for large size and in some of the sweet cherry districts the set of fruit can be so heavy that much of the fruit may be smaller than desired. Since no chemical thinning procedures have been developed some growers have done a limited amount of hand thinning on sweet cherries.

Apricots will commence to ripen in early June. I'm looking forward to seeing and tasting this fruit when tree ripe. I imagine they'll taste a lot better out here than they do after shipment across the country. Peaches are as big as golf balls now and the hand thinning of this fruit is nearly done.

Speaking of peaches I had a chance to travel through the cling peach area in Sutter County last week. This section which is planted to about 15,000 acres of cling peaches is located about 40 miles north of Sacramento. Last winter when unusually heavy rains fell in December sizeable areas near Yuba City and Marysville were flooded. In some orchards one can see (where litter still hangs in the trees) that some orchards were immersed in 8 to 10 feet of water. In some of these areas, many peach trees have died or are dying. Almonds show some injury from flooding, also. However, walnuts and plums appear to be uninjured following similar flooding.

One of the problems facing peach growers in these flood areas where the trees are dead or dying is the old peach replant problem (peaches planted after peaches often do not grow well). In California, the peach replant problem exists for both cling and freestone peaches north of Modesto. The failure of peaches to do as well after peaches as they do on "virgin" soil is a general problem throughout this country and in many foreign lands. No real solution to the problem has been found. The trouble is very specific to the peach. For example, almonds or apricots propagated on peach root may not grow well on old peach sites either. The peach replant problem here has not been solved by soil treatments for nematodes or oak root fungus - although such treatments may help improve tree growth where serious infestations of nematodes or root disease organisms are present. The true peach replant problem, which is related to toxic substances arising from old peach roots, has not been solved by changes in fertilizer practice, either.

Nutritional problems on deciduous tree fruits are plentiful in California, also. Not only have deficiencies of boron, potassium and magnesium been found here, as they have in New England, but also deficiencies of manganese, iron, zinc and copper have been found. In addition, excess boron injury is apt to occur whenever the irrigation water contains more than 1.5 ppm of boron.

---F. W. Southwick

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PROTECT YOUNG TREES FROM INSECTS

Your young orchard deserves protection. You've spent money preparing the land; you've purchased the trees; you've spent something on disease control. In other words, you have an investment; why let it deteriorate through neglect?

At least three, possibly four, insects are likely to require attention. They are the green apple aphid, the round headed apple tree borer, the buffalo treehopper and the apple leafhopper. Occasionally, under some types of management, mites may become a problem. Rarely, one of the scale insects may cause some real damage.

It takes only one or two apple tree borers to kill a small tree. Since the female beetles may lay up to 25 eggs apiece, it does not take many beetles to set up a serious infestation in a young orchard. The beetles do not prefer other plants for egg laying, but their larvae have been found in shadbush, crab-apple, mountain ash, some chokecherries and hawthornes and other fruit trees.

The adult beetles emerge from late May until the early part of July. Egg laying begins shortly after the first adults emerge and may continue on into August.

The adult beetles feed upon the bark and foliage of host plants. There is evidence that they prefer to feed upon hawthorne and perhaps shadbush, even though their egg laying preference seems to be young apple trees. They tend to feed more on the bark of twigs than upon leaves, but in neither instance is this feeding enough to be serious.

This habit of feeding, however, does provide a simple method of effective control, at least where the infestation has never been allowed to become well developed. Lead arsenate used at 3 pounds per 100 gallons, plus a good sticker, will provide good control. Applications should begin as the first beetles start to emerge in late May or early June. For a high degree of control, and particularly where the infestation is building up and likely to be serious, the insecticide should be applied to hawthornes, shadbush and wild fruit trees within the vicinity as well as to the young trees themselves. It is important also that the application be repeated after an interval of 2 weeks to cover new growth and to assure a toxic residue throughout the period of beetle emergence and egg laying.

Developing infestations of the green apple aphid normally become apparent by late June. The inclusion of some aphicide with the second application of lead arsenate should check such an outbreak.

Several materials could be used against the aphids and some of them would also knock out any leafhoppers that were getting started. These might be nicotine sulfate, if you wish to protect predators of aphids and mites as much as possible, or it could be benzene hexachloride (BHC) or lindane.

A systemic insecticide such as demeton should give complete control of aphids, leafhoppers and mites and not be particularly damaging to the predator population. Demeton could be applied somewhat later June or even in early July, after the leaves had become somewhat curled. To obtain a high degree of control with the other materials or with malathion and TEPP, it would be necessary to make the applications before serious leaf curling had occurred and they certainly would have to be repeated two or three times on some varieties or when conditions were favorable to the aphids.

Demeton is extremely toxic like parathion and TEPP. It should be handled with all due respect. Follow all safety precautions listed on labels for any of these materials. Directions for diluting the materials are always found on labels and are reliable.

The buffalo treehopper causes damage to the trunks and branches of young trees through its egg laying activity. Deep slits are made in the tender bark and where they are numerous, the affected parts are heavily scarred, may be stunted or even killed.

Upon hatching in May or June, the nymphs of the treehopper move to succulent plant growth such as weeds, various legumes like alfalfa, sweet clover, and a few others. You can readily see that clean cultivation of young orchards would be an effective control measure for the buffalo treehopper.

DDT is very effective against both nymphs and adults of this treehopper. Some of the materials used as aphicides, such as BHC, lindane, malathion and perhaps demeton, also should be effective against them, but might not give as long-lasting residual effect as does the DDT.

Regardless of the material used, the best time to make the application is about mid-July or as soon as any adult treehoppers are discovered.

The treatment should be made to all the vegetation in the orchard and for a distance of about 100' around the orchard if good control under conditions of severe infestation are to be expected.

Once again, let me remind you; you have an investment, why not protect it?

---E. H. Wheeler

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SPECIAL CIRCULAR RECENTLY REVISED

The following circular has been revised and is available to anyone wishing a copy.

Special Circular #215 "Controlling Weeds in Strawberries With Chemicals"

Address requests to either the Department of Pomology or the Mailing Room, University of Massachusetts, Amherst, Massachusetts.

---Editor

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McINTOSH - 1955 - 56 - 57

An unusually warm growing season, a large local crop and an unusual harvest drop complicated the marketing situation for McIntosh apples.

As a result, too ripe and too much-too late seem to be the key notes of the 1955-56 McIntosh apple season. Those who sold on a strictly wholesale basis are not happy over the result. Those growers who sold a substantial quantity directly to consumers are better satisfied with the year, but still not altogether happy.

Out-of-Storage Movement - 1955 - 56

The first month of selling after October 15 was nearly in line with the solid line on the Out-of-Storage Movement charts released by the Extension Service for the study of McIntosh marketing. During the last two weeks of October, however, the movement out of storage was somewhat slower than is considered most effective. The first month resulted in a movement 5-10% slower than would have been desirable looking at the season after it was closed. To visualize the importance of a good rate of movement in last October, it is only necessary to realize that 10% of the October holdings represent nearly the entire holdings on April 1. Small percentage changes in the first part of the season have a way of becoming very important in the latter part of the season.

The out-of-storage movement lagged during the second month, so that on December 15 the season movement was about 20% behind standard. The Christmas holidays saw the slowest movement of any two-week period of the season. There was a nearly normal rate of movement in early January from existing supplies.

As a result of the slow movement out of storage, the quantities remaining to be sold were about one-third too many on January 1, one-half too many on January 15, nearly double on February 1, three times the standard on February 15, four times standard on March 1 and seven times standard on March 15.

Prices - 1955 - 56 (Special Apple Market Report - Boston)

The period between harvest and about the middle of October is a price testing period, when the forces of demand and the forces of supply work out a basic price for the season. Last fall the price started for McIntosh US Fancy 2-1/2 and up in a crate at an average of \$2.62. On September 20, this price had lowered to \$1.62 and for eight successive reports the price for this grade averaged to be \$1.62 for a crate of McIntosh, which is used as a base price on the chart.

On October 18, 20 and 25 the price rose to an average of \$2.12 and held at that point until November 15. In the last two weeks of November, the price was off a quarter to \$1.87. On December 1, the average price rose to \$2.00 and stayed at that point until December 20. In the three-week period at the end of the year and through January 12, the price was again at \$1.87, and only one quarter up from the starting price on October 15. On January 19 and 26 and February 2 the price had settled to the starting price of the storage season.

From February 9 to 23, the average price was just a little over \$2.00 and again settled back to \$1.82 in early March. On March 15, the average price rose to \$2.25 and held at about that point through the first of April.

In retrospect it can be seen that the price rose in the very early weeks of the storage season to a point nearly as high as it was at the close of the normal storage period.

Prospects - 1956 - 57

A somewhat less than average crop in New England, in the Eastern United States and possibly in the Western United States together with good buying power on the part of consumer, sets the stage for a price level, at the start of the season, somewhat higher than average. Close estimates of the crop are not available as this is being written (June 5). Cold injury is reported but the effect in terms of actual crop is not known.

Current reports indicate a McIntosh crop in Massachusetts about 25% to 40% less than the bloom indicated might have been possible.

A crop of 1/3 less means that the fixed costs on a bushel will be at least 65 cents more per box than average.

Every possible effort will have to be made to grow and harvest as many first-class apples as possible in order to increase total sales and reduce unit costs.

Unusually careful and aggressive marketing will need to be carried out to secure necessary returns. This is not a year when a return over costs can be taken for granted.

---F. E. Cole

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

AUGUST 15, 1956

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GLEANINGS FROM THE PACKING HOUSE SURVEY

During the winter of 1954-55 I made a survey of the condition of McIntosh apples as offered to consumers in retail stores in Massachusetts. This survey revealed that 32% of the apples offered to the consumer were culls, 32% were Fancy or better and the balance were mostly Utility grade. Such apples are no inducement to a customer to come back for more.

What was the principal trouble with these apples? Bruises, stem punctures, cuts, rot and lack of color. Is this situation the fault of the store keeper, the middleman, the trucker or the fruit grower? Where in the harvesting and marketing process does most damage to the fruit occur? It may take some time to find the answer but a beginning was made during the winter of 1955-56 when a survey was made to determine the condition of the fruit as it left the packing houses.

In this survey seventy samples were obtained from sixty-four different growers in various parts of the State. Occasionally two samples were taken from growers who had two styles of packs.

Samples picked at random, were obtained by taking forty-eight apples from a lot which had been packed for market. These samples were carefully placed in a cell type carton and taken to the laboratory at the University for analysis.

Each apple was graded according to U. S. Standards, and an analysis made of the below fancy grades to determine why they were below fancy. Also, the number of bruises over one-half inch in diameter were counted and classified. Blemishes due to stem punctures, cuts and cracks were recorded. Other observations were made but you are more concerned with results than procedure.

How did the apples in this survey grade out and how did the results compare with those obtained the previous year from the survey of apples in retail stores?

In the store survey 33% of the apples were Fancy or better. In the packing house survey 71% were Fancy or better which suggests a marked deterioration between the packing house and the consumer. It should also be noted that there is considerable room for improvement in the apples as they leave the packing house. The various packs ranged from 29% to 94% fancy or above with half of the samples falling in the 60-80% range.

The fact should not be ignored that 5.5% of the apples as packed for market were culls and that 2% contained some rot. Such apples do not encourage repeat sales.

What caused apples to be below fancy as packed for market? The same defects that caused them to be below fancy in retail stores, namely: mechanical injuries and lack of color. By far the most important cause for low grade fruit are bruises, cuts and stem punctures. These mechanical injuries amount to 61% of the total cause of apples being below fancy at the packing house as compared with 83% in retail stores. The lessons to be drawn from this are: 1. That growers should look more critically at their own packs before accusing the storekeepers of causing most of the damage. 2. That too much bruising occurs between the tree and the package.

The percentage of apples below fancy because of insufficient color in packing house samples in 1955-56 was 6% greater than was found in the retail store samples in 1954-55, being 29% and 23% respectively.

In most instances the poor colored apples were found in packages that were supposed to be fancy or above. This could have happened only in one place and that was the packing house.

Bruises account for the greatest quantity of low grade fruit. In the packing house survey 34.7% of all apples examined had one or more bruises 1/2" or over. Bruises less than 1/2" in diameter were of relatively little importance and were not counted in the packing house survey. Of all bruises 1/2" or over 84% were in the range 1/2" - 3/4", 13.3% in the range 3/4" - 1" and 2.7% were 1" or over. Several lots had less than six apples with bruises 1/2" or over while others had as high as thirty-eight apples out of forty-eight with bruises 1/2" or over. This clearly demonstrates that even McIntosh apples can be handled with a minimum of bruising and that an excess of bruising can be attributed solely to careless handling.

While in general, there appeared to be some advantage of hand grading over machine grading relative to the amount of bruising yet some of the lots with the least number of bruises were machine graded. This suggests that machines are not necessarily at fault but it is how they are used that makes the difference.

In both the packing house and retail store surveys insect and disease blemishes, poor shape and russet combined were less important as the cause of below fancy fruit than either mechanical injury or lack of color.

Possibly the most startling discovery from the packing house survey is the relationship between type of package and the incidence of bruising. This is shown in the following table:

Type of Package	Number of Samples	Fancy & Ex. Fancy (percent)	Below Fancy (percent)	Bruised (percent)
Crate	33	69.0	31.0	32.3
Carton (cell pack)	21	76.7	23.3	36.3
Prepackage	15	68.1	31.9	35.8
Western box	1	66.7	33.3	54.2

These figures may be startling because of the general opinion that the crate contributes materially to the bruising of apples. Except for the higher percentage of fancy or above with a corresponding decrease in below fancy there seemed to be relatively little difference whether the apples were packed in crate or were pre-packaged with respect to grade or amount of bruising. The one lot packed in a western box is only indicative of its effect on bruising because if more such packs involving a greater number of packers could have been obtained the effect on bruising might have been reduced.

The percent of bruised apples in each case represents the percent of all apples, packed in the respective type of package, which had one or more bruises at least 1/2" in diameter.

These figures indicate that the type of package in which the apples are placed is of less importance relative to bruising than the way they are handled previously.

It should be emphasized that these figures refer to the condition of the apples as they leave the packing house and not what their condition might be after they have passed thru the various market channels.

What have we learned from the surveys that have been conducted over the past two years?

1. From retailers comments that people want to buy and will pay the price for good apples.
2. That in too many instances the condition of the fruit as offered to the consumer does not encourage maximum consumption.
3. That bruises, cuts and stem punctures are primarily responsible for the unattractive appearance of the fruit.
4. That often apples lacking in color are mixed with well colored fruit depreciating the appearance and value of the lot.
5. That the same factors, namely; mechanical injuries and lack of color are causes of low grade fruit at the packing houses as well as at the produce counter in retail stores.
6. With the exception of the lone sample of the Western box, the type of package in which apples are placed has less effect on freedom from bruises than the way the apples are handled before they are packed.
7. That, in general, more bruises occur before the apples leave the packing house than occur between the packing house and the consumer.
8. That it is possible to keep bruises at a minimum until the fruit leaves the packing house because several growers are doing it.
9. That growers should check their packages more often to make sure that the pack is what they think it is.

Finally, these surveys point to:

1. The necessity of a constant effort to reduce mechanical injuries from the tree to final delivery to the consumer.
2. The desirability of separation of fruit into grades according to established standards rather than the mixing of grades to the detriment of the better apples.
3. The elimination of deceit and adherence to the principle of an honest pack,

These are the basic essentials for increased sales and the future prosperity of the fruit industry.

---O. C. Roberts

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THE STORAGE AND RIPENING OF PEARS

Although Massachusetts does not raise a large volume of pears, there are a number of growers who do have a few acres of them. Certainly this fruit is rather well adapted to Massachusetts and if harvested, stored, and ripened properly it can be a popular retail stand item and help diversify an orchard enterprise.

The storage and ripening of pears, however, is somewhat more complicated in certain respects than apples. Hence we thought a few words on this subject might be of interest to pear growers and their customers. Failure to recognize certain varietal differences, storage requirements, and ripening procedures can ruin otherwise well grown fruit.

Pears should be harvested before becoming fully ripe. If left on the tree until yellow they are frequently soft and decaying on the inside. Even if the interior remains sound the flesh is often coarse, gritty, and of poor texture and taste. Hence, pears should be picked before eating ripe and ripened off the tree. Studies in Washington, California, and New York indicate that the use of a pressure tester, employing the small pear head (5/16" diameter) is a valuable guide in determining when pears should be picked. The pressures suggested for several varieties are as follows:

Anjou	13-15 lbs.
Bartlett	17-20 lbs.
Bosc	14-16 lbs.
Seckel	16-18 lbs.
Winter Nelis	14-16 lbs.

After harvesting, unless the pears are to be sold immediately, pears should be stored promptly at 32° F. At this temperature ripening proceeds very slowly. When pears are to be ripened this is best done by placing them in a humid chamber at 60° to 70° F. Under such conditions a good yellow color, a smooth, buttery texture, and the best flavor develops without the least chance of shriveling of the fruit. It is realized that most growers have no special room for this purpose but it might be possible to approach such a condition if pears to be ripened were stacked in the shade on warm fall days, heavily wet down with a hose, and covered with a canvas or tarpaulin of some sort. Ripening may be hastened by placing a box of ripe apple drops in the stack. Such apples will produce sufficient ethylene to hasten the ripening of the immature pears. Of course, in late fall and winter the pears could not be placed out of doors.

Another factor to be kept in mind is that pears have definite limits beyond which they should not be held at 32° F. if they are to ripen properly when removed from cold storage. For example, Bartlett should not be held in cold storage much more than 90 days, Bosc and Seckel 90 to 100 days, Anjou 150-180 days, and Winter Nelis 160-180 days. If the fruit is held in cold storage for periods beyond those suggested the pears often lose their capacity to ripen properly when placed at 60° to 70°F. Pears stored too long are often subject to core breakdown and scald. It should be realized, also, that if pears are stored at temperatures above 32° F. the safe storage period will be shortened. Pears stored at 40° F. may have only about half the cold storage life of pears stored at 32° F.

---F. W. Southwick

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ARE YOUR PICKERS WITH YOU?

Bill Doe - O. C. Doe and Sons, Hawbuck Orchards, Harvard, Massachusetts - has his pickers working with him. They are interested in picking good apples. They are quality conscious. The pickers are competing with each other for a daily bonus that means better apples for Bill to sell.

Here is how it works. Simple!

Bill took one of his best PACKERS and put her in the orchard checking apples as they were picked. She made one check on each picker both morning and afternoon. She checked "rough-looking boxes - each one all the way through". At 4:30 p.m., she added up the score. One-quarter of the pickers with the smallest amount of picking injury got a nickle bonus on their pick for the day, every day. Bruises, stem punctures, cuts, or any other form of picking injury was counted against them. Some time a special check was made on certain pickers. If more than two boxes were checked, the two highest counts (most injury) were used for the daily total.

The pickers like it, naturally. They are now taking a special interest in doing a good job of picking. Bill likes that. It's easier to get pickers, too. Bill has found the migratory help, picking 100 or more boxes per day, are usually among the winners.

Injury has been reduced to between 10 to 20 marks per box.

Bill sells more apples than he grows. Late in the season he took part of his crew to other orchards. He found that in these other orchards the pickers were making between 50 to 80 marks per box as a regular thing!

The boxes with the low injury sell for 25¢ to 50¢ more per box.

All this for a nickle more on one quarter of the boxes picked!

A NICKLE GETS HIM AT LEAST A DOLLAR.

Where else?

---F. E. Cole

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PROTECTANT FUNGICIDE SCHEDULE FOR THE CONTROL OF FUSICOCUM PEACH CANKER

Two infection periods are recognized in the life cycle of the pathogen: (1) Autumn season infections of buds of current season's growth; (2) Spring season infections of leaf cluster buds, basal portion of herbaceous axillary shoots and leaf blades. Autumn season infections occur in rain periods from late September to the onset of cold weather, and the earliest cankers appear in October and they continue to appear, with the advance of the fungus from infected buds into the bark about the nodes, throughout the winter, early spring and through the blooming period. These cankers provide the inoculum or conidiospores for the spring season infection phase which occurs after the bloom and in rain periods. Disease from

these infections appears in June, such as dead leaf clusters and axillary shoots, basal shoot cankers and leaf spots.

A tight protectant spray schedule covering the two infection periods has given good control of the disease. The protectant schedule is started around September 20 or about one month after Golden Jubilee harvest, and continued at 10-12 day intervals using a mixture of 1/4 lb. of Dichlone, 1 lb. of Ferbam, and 1 pint of Glyodin to 100 gallons of water. Glyodin is added as a spreader. Good coverage of buds and protection in advance of rains is important. Captan and Thiram are also effective. Final application is made when 90% of leaves have fallen. For this last application, liquid lime sulfur (6-1/2 gals.) or dry lime sulfur (24 lbs.) and 1 pint of Glyodin will be used this autumn.

The lime sulfur-Glyodin is repeated at early delayed dormant in the following spring season. It is followed by Phygon-Ferbam at full pink, calyx and shuck fall, coinciding with the schedule for the control of early brown rot.

In addition to thorough protectant spraying, pruning in June in addition to dormant pruning is most desirable as a sanitary control measure.

---E. F. Guba

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ARE YOU LOOKING FOR APPLE RECIPES?

You should let the public know how apples lend themselves to so many different uses in the day's meals. Let other people besides yourself have the opportunity to enjoy your wife's favorite recipe using apples.

Recipes printed on polyethylene bags or on flyers placed inside of apple containers is good marketing.

Growers have found that using one recipe at a time is most effective as a hand-out.

Below are three good recipes using apples that May E. Foley, Extension Nutritionist, University of Massachusetts says make good eating.

Apple-cheese Dessert

5 cups apple slices (pared)	1/2 cup sifted flour
1 Tablespoon lemon juice	1/4 teaspoon salt
3/4 cup sugar	1/4 cup table fat
1/4 teaspoon cinnamon	2/3 cup grated cheese

Fill pie pan or shallow baking dish with apples; sprinkle with lemon juice and 1/4 cup of the sugar.

Mix cinnamon, flour, salt and the other 1/2 cup sugar. Cut in fat until mixture is granular. Stir in cheese. Spread over apples.

Bake at 350° F. (moderate oven) until apples are tender - about 40 minutes.

Cool before cutting to serve. Serve with plain cream or ice cream, if desired, six servings.

Applesauce Drop Cookies

1/2 cup fat	1 teaspoon cinnamon
1 cup sugar	1/2 teaspoon cloves
1 egg	1/2 teaspoon nutmeg
1-3/4 cups sifted flour	1/2 cup seedless raisins
1/2 teaspoon baking powder	1 cup quick-cooling rolled oats
1 teaspoon soda	1 cup applesauce
1/2 teaspoon salt	

Cream together fat and sugar; stir in the egg.

Sift together flour, baking powder, soda, salt, cinnamon, cloves, nutmeg. Mix in raisins and rolled oats. Add to creamed mixture in three portions alternately with applesauce in two portions. Beat well.

Drop dough by teaspoonfuls onto greased baking sheets. Bake at 375°F. (moderate oven) about 15 minutes. Makes about 3 dozen cookies.

Apple Relish

1 cup finely chopped unpared apples	1/3 cup sugar
1 cup finely shredded cabbage	3 Tablespoons vinegar
1/2 cup finely chopped celery	1/2 teaspoon salt
1 Tablespoon chopped green pepper	1/4 teaspoon ginger
Dash of cayenne pepper	1/4 teaspoon mustard
1 Tablespoon chopped canned pimiento	

Mix apple, cabbage, celery and green pepper.

Combine sugar, vinegar, spices, and pimiento. Add to the apples and vegetables and mix lightly but thoroughly.

Yield: 2 cups.

If you would like to see other recipes using apples, send for Special Circular #156, Extension Service, Mailing Room, University of Massachusetts, Amherst.

---Editor

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N O T I C E

The 1956 revision of Special Circular No. 254 entitled "Preharvest Drop Control Of Apples" will be available in August. It can be obtained through your County Extension Service or the Pomology Department, University of Massachusetts, Amherst.

LET'S REDUCE BRUISING

If the apple grower expects to receive the best price for his product, he must first get those good apples off the tree and into storage efficiently and with as little bruising as possible. In the packing house survey conducted by Prof. O. C. Roberts in 1955-56 he found that 34.7% of all apples that he sampled were bruised. Good organization and management of the harvest operation will help minimize bruising!

Some pickers damage an unbelievable number of apples. Bruised apples are more apt to decay and thereby affect the rest of the apples in the box by ripening faster. Research data have shown that bruised apples respire faster and give off ripening gas early. Sale of bruised apples means dissatisfied customers; dissatisfied customers mean reduced sales! How can the grower reduce the amount of bruising when he has an inexperienced crew?

Carefully conducted studies have shown that much of the bruising which occurs at harvest can be reduced by close supervision. Careful supervision is the backbone of a good picking crew! Take time to show pickers how to pick properly and avoid bruising. Although many growers have read or heard the previous statements many times, how many actually heed the suggestions? Make use of Special Circulars 245, "Harvesting Suggestions for Orchard Foremen" and 246, "Be a Better Apple Picker!" If you do not have copies of these circulars they may be obtained at your County Extension Service.

Poor pickers cost growers money! Have you ever figured out how many less severely bruised apples per box it will take to more than pay for a bonus to good pickers? If you pay your pickers good wages, you can be in the "driver's seat." In other words, a worker will take more constructive criticism if he is being paid for his efforts.

Harvest Procedures Worth Consideration

The following practices have proven profitable for growers. One or more of these practices or perhaps some modification of a practice may be practical for your situation.

1. Use inexperienced labor for carrying filled boxes to central locations for handier loading, leveling filled boxes and other time consuming jobs. The good pickers should be picking fruit!

2. Hire a checker to inspect random boxes of the pickers' fruit. Set up a score card for pickers and post where they can compare their ratings with the rest of the pickers. Pay a bonus to pickers who keep the damage to the fruit at a minimum.

3. Pay a bonus to pickers who stay through the entire season.

4. Some growers have found it advantageous to pick into half bushel peach baskets. The fruit is hauled to the packing house in a truck having a compartmental platform for holding the baskets. The baskets of fruit are then dumped into the grader.

5. It has been reported that the use of a low stool, about 2-1/2 to 3 feet high with a top large enough to hold an apple box is both a time and labor saver. Pickers

can pick directly into boxes from low branches which saves time and reduces bruising. The construction of one or two steps on the stool would be beneficial. The additional 12 to 20 inches of height will enable the picker to reach quite a few apples.

6. Place hardwood skids across the trailer bed. These enable the worker who is loading the trailer to push the stack of boxes toward the center of the trailer after building a stack of the desired height on the edge of the trailer platform. The whole load can be handled from the ground.

7. In some operations the use of tractors with fork-lift attachments is profitable. The worker assigned to leveling boxes places the leveled boxes on pallets. The loaded pallets are lifted onto a trailer or truck by means of the fork lift.

8. Double decked trailers are useful in some operations. By use of these, two layers of boxes can be hauled without the necessity of leveling the boxes in the orchard.

9. The common method of loading trailers uses one worker on the ground to lift boxes onto the trailer bed. Another worker stands on the trailer bed and picks up the boxes and places them into hauling position.

Loading time can be reduced by having the man on the trailer stack the center row first. He should then get off the trailer and assist the other worker in completing the load.

10. When the orchard is distantly located from a storage frequently it is necessary to accumulate truck loads of apples in or near the orchard. Some growers build platform areas or sheds on which to assemble the fruit. When unloading the trailer, the boxes are built to six high and then hand-trucked over a bridge plate to the platform. When the road truck arrives it is backed up to the platform and the fruit is hand-trucked across a bridge plate to the road truck.

---W, J. Lord

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LEGAL LIABILITY RISKS AND INSURANCE PROTECTION FOR FARMERS

In the first article in this series we discussed the kinds of legal liability which result from the fact that you decide to become a farmer and operate a farm. This article will discuss the risks a farmer assumes when he becomes an employer.

Liability To Employees

Farmers - like other employers - are expected to safeguard their workmen from harm while they are on the job. You as an employer must provide them a safe place to work, furnish safe equipment, and give them proper supervision. You assume a high degree of responsibility when you allow employees to work in dangerous situations not of their own choosing.

This type of liability is restricted to action against a farmer because of injuries or death suffered by a workman, because of the hazards of his employment.

Before the passage of the workmens' compensation laws, farmers, as well as other employers, were liable in court for injuries to employees only when negligence was proved against the employer. If, on the other hand the employee were solely at fault, his employer was not liable. Because of the difficulty of deciding liability when both employer and employee were at fault in some degree, it was generally ruled - under common-law doctrine - that if the employee contributed to the accident he could not obtain a judgement. When workmens' compensation laws do not apply to farmers, this general rule may still apply. When, however, a farmer elects to take workmens' compensation insurance even though he is not required to do so, then the common-law rules on negligence do not apply. Payments are made under workmens' compensation insurance without regard to fault.

Workmens' compensation laws were passed originally to protect industrial employees working in dangerous occupations. The law provides a schedule of awards to be paid for each type of injury to an employee. The matter of negligence is disregarded. The protection of Workmens Compensation laws has been extended over the years to employees in less dangerous occupations.

The increased use of machinery on farms has resulted in an increasing toll of accidents among farm workers.

A farmer should find out if he comes under the workmens' compensation law, in particular if any part of his operation is covered by the law.

Two Types of Employer's Liability Insurance

There are two types of liability insurance available to farmers as protection from suits resulting from injury or death to employees.

- (1) Employers Liability Coverage
- (2) Workmens' Compensation Insurance Policy

Employers' Liability Policy Coverage

Under the laws governing employers' liability, a farmer ordinarily would not be held liable in court if his injured employee were found negligent. If the farmer were found negligent, the amount of the award to the employee might be substantial. A farmer might be in great difficulty, if he had no liability insurance coverage, since he would have to pay costs of defense as well as pay a judgement against him.

The significant thing about the employers liability policy is that it protects the farmer against suits by his hired help. Whether the farmer is liable or not is largely governed by who is at fault, the farmer or his employee.

Usual basic coverage provided by an employers liability policy is \$5,000 for bodily injury or death to one employee, and \$10,000 if two or more employees are involved in the same accident. Medical payments of \$250 for each person injured are usually included in the basic policy. Higher limits may be obtained for extra premiums.

Workmens' Compensation Insurance Policy

A workmens' compensation insurance policy guarantees payments to an injured employee in accordance with a schedule of awards, by type of injury, established

by the workmens' compensation law. Under this policy the question of negligence or fault is disregarded and an award to an injured employee by the State Industrial Accident Board is payable by the insurance company that issued the policy covering the injured employee.

In instances where farmers are exempt from workmens' compensation laws, they may elect to come under the laws voluntarily. They may do this by taking out workmens' compensation insurance, by notifying the State Industrial Accident Board of this action, and by posting notice of such action on their premises.

The significant thing about workmens' compensation laws is that they establish the schedule of payments that must be made to an employee for each type of accident he might suffer and the amount for accidental death as well as compensation for loss of wages. Workmens' compensation insurance guarantees these payments; there is no top limit on the total amount which may be paid.

In addition, after due notice to the employee the workmens' compensation insurance has been issued to his employer, the employee is "estopped" or barred from suing his employer for injuries or death resulting from employment.

The premium for workmens' compensation depends upon the rate per \$100 of payroll and the amount of the annual farm labor payroll. If a farmer furnishes room and board, the value of these items is added to the actual money payment to determine the total payroll. A minimum annual premium is also charged.

Farmers should consult their insurance agent for details of coverage, rates, and policies available.

---L. D. Rhoades

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OBSERVATIONS IN CALIFORNIA

This leave of mine is about to end and by July 2 my family and I will leave California on our way back to Amherst. However, we plan to go north into Oregon and Washington and I hope to get at least a brief picture of their tree fruit industry during the 7 to 10 days I expect to spend in those States.

Since I last wrote I've had a chance to see something of the apricot picking, packing, and eastern shipment deal in the Winters section. This area is planted to about 4,000 acres of apricots. The Winters district, which is about 12 miles from Davis, is the earliest apricot section in California. It's rather surprising that although Winters is only a few miles from Davis their apricots ripen 10 to 14 days ahead of apricots in the University plantings at Davis. Apparently, the night temperatures at Winters average a few degrees warmer than they do at Davis during the growing season and this fact accounts for their earlier ripening. Earliness in ripening is a very important factor in the raising of this fruit for eastern shipment since the early shipments command the best prices. Actually, the shipping deal lasts about 10 days to two weeks in Winters and the rest of the crop goes to the cannery or is cut and dried. This year the crop at Winters is a little short so very few fruits are being dried since canners are paying good prices for the bulk of the nonshipped fruit.

Another thing which interested me considerably this month was an opportunity to see some of the large vegetable and strawberry acreage in the Watsonville - Salinas area. This area is near the coast around Monterey Bay. In this area the climate apparently is ideally suited for leafy vegetables and strawberries. The summers in this area are cool with maximum temperatures rarely in the 80's. Under these cool climatic conditions strawberries, in huge acreages, produce fruit from April through October. The hill system of planting is the one employed. The tops of these plants are not especially large but the plants flower and fruit simultaneously over a very long period and hence the yields on a per acre basis are tremendous by eastern standards. Yields of 30 tons per acre have been recorded although the average per acre yield is somewhat less than half this amount. As with most crops irrigation is standard practice, even on hilly land, and the plants aren't irrigated with sprinklers either. Rows are planted on the contour and water is carried to each row from a flume. The berries I've seen are firm and capable of being shipped to the east coast.

Although I haven't spent much time studying the vinifera grape situation here I am interested in looking at them and observing the cultural methods employed. The pruning methods used on these grapes are different from those employed on our eastern American grapes. Their system of pruning and method of supporting the vines (if any) varies greatly with the variety and its use.

All wine and raisin varieties seem to be trained to a central trunk and the canes cut to short spurs (leaving 2 to 4 buds per spur depending on its size). Initially the main trunk is tied to a stake to provide mechanical support but eventually as the trunk gets large and rigid enough no support is needed. Some of the trunks in old grape vineyards may become a foot or so in diameter. No trellis is used to support the new fruiting canes, either.

With the table grapes the spur type pruning may be employed (for Tokays) or cane or cordon pruning may be used, depending on the variety. The table grapes are trellised. Many trellises are built waist high with a sloping horizontal top which is about 3 feet wide. The trellis slopes toward the south and as the canes are supported on the wires of this sloping trellis, the bunches of grapes hang down underneath, much as they would in a grape arbor. This method of training shades the fruit from direct sunlight during mid-day and makes picking easier.

Many of the fancy table grapes require thinning for various reasons depending upon the variety. The three types are flower, cluster, and berry thinning. Flower thinning is done before the flowers reach full bloom to improve the set of varieties which otherwise produce loose clusters. Cluster thinning is done shortly after the berries set to reduce an overload and improve fruit size and coloring of remaining clusters. Berry thinning consists of removing parts of clusters after the berries set to reduce cluster compactness. This practice is necessary when Thompson Seedless is grown as a table grape and the vines have been girdled. Girdling of Thompson Seedless may increase berry size 100% and is a common practice when this variety is grown for the fresh fruit market. I'm told that some old Thompson Seedless vines have been girdled annually for 20 years and are still producing good crops.

---F. W. Southwick

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For MORE Customers - Have FEWER Flies

Flies do NOT attract customers, but many roadside and farm stands and cider presses DO attract flies.

You, Mr. Owner or Operator, can DO SOMETHING ABOUT IT.

1. CLEAN UP AND KEEP CLEAN!

Flies are attracted to moisture -- especially juices from fruits, vegetables, milk, eggs, and meats. Fruit pomace and any decaying fruit, vegetable or meat scraps are attractive to flies. Even small amounts, if moist, may be a breeding ground for more flies.

Provide tight containers with tight covers such as galvanized cans for wastes. Stand them on a hard, easily cleaned surface. Empty waste containers and clean them every day. Bury or burn the wastes immediately -- flies travel farther than you may think possible.

Clean out and remove empty boxes, baskets, cartons, etc. Store them as far from the stand or mill as possible. A dump out back may be out of sight, but the flies it attracts and breeds will be out front in full view.

2. USE RESIDUAL INSECTICIDES ON SURFACES!

Apply residual materials to all surfaces in and around the stand or mill on which flies commonly rest. AVOID contamination of edible products.

Wettable powders leave a visible deposit; emulsifiable concentrates diluted with water do not; oil solutions are not diluted and leave no visible deposit.

DDT is still effective against many flies, including the tiny fruit or vinegar flies; methoxychlor is similar and preferred inside the stand or mill; outside surfaces and dumps may be treated with the above or with chlordane or Diazinon, the latter being very effective against flies immune to other materials. Malathion is safe and effective, but has a short residual life. Both diazinon and malathion are more effective if sugar is added to them as directed on labels.

3. BAITS SUPPLEMENT other MEASURES!

Baits containing malathion are available under many brand names. Use them sparingly, but frequently, on all horizontal, dry surfaces in or around the stand or mill where flies tend to gather.

4. SPACE TREATMENTS ESSENTIAL TOO!

Stands and mills that can be closed up completely or enough to prevent cross ventilation may be "space treated" with a finely atomized spray or aerosol. All flies then in the building should be killed by the treatment; there is no residual effect.

Apply space treatments at closing time and at other times as operations permit and flies make it desirable.

Pyrethrin or allethrin, each synergized by materials like piperonyl butoxide, sulfoxide or others, are the chief killing agents. Some products contain methoxychlor or other materials. Products containing DDT, chlordane or similar materials should not be used unless edible foods are covered.

Apply space treatments by using oil based pyrethrin or allethrin "fly sprays" in hand or electrically operated atomizers or by using aerosol bombs. Large (5-lb) bombs are less expensive than smaller types if used according to directions. Otherwise the smaller types may be just as convenient and no more costly.

Read the list of "active ingredients" to get what you want. Follow "directions for use" to do the best job safely.

5. FANS HELP

Fans that direct a current of air across displays may help greatly to keep flies off those products especially attractive to them. Air currents directed out of doorways from inside and above will reduce the numbers of flies which enter.

BUT -- REMEMBER THIS!

Without your complete attention to NO. 1, you cannot expect the suggestions under No's 2, 3, 4, and 5 to solve your fly problem.

---E. H. Wheeler

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ARE YOU USING AN APPLE BOX DUMPING AID?

Although research data has shown that one of the greatest causes of bruising in grading operations is careless dumping onto the receiving belt or the feed table of the grader, many growers still are not using an apple box dumping aid. The bruising that occurs during the dumping of apples on the grader is one of the easiest and least costly to minimize. Let's do something about it!

The use of a pad placed over the top of an apple box when the box is tipped can reduce bruising. After tipping the box, the worker should gradually raise the pad to allow the apples to roll gently onto the receiving belt of the feed table on the grader. Counter balancing the pad makes it more convenient to use.

Another inexpensive dumping aid is a canvas bag. "The operator places a canvas bag, with one end tacked to the grader, over the top of the box of fruit while he tips the box over. Then he releases the bag and lifts the box gently to allow the apples to flow out."

---W. J. Lord

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

SEPTEMBER 15, 1956

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INCREASED SALE OF APPLES IN FIVE POUND BAGS

Carefully conducted experiments in eight super markets in Rochester, New York confirm previous experiments by Prof. Max E. Brunk and others that significantly more apples are purchased per one hundred customers when the apples are displayed in five pound rather than three pound polyethylene bags.

This experiment was conducted between February 20 and March 19, 1956, by Dana G. Dalrymple, under the direction of Prof. Brunk of the Department of Agricultural Economics at Cornell University.

Comparisons were made among four merchandising practices as follows:

1. 3-pound unprinted polyethylene bags.
2. Two 3-pound unprinted polyethylene bags priced in a combination unit at a 1¢ discount.
3. 3-pound printed polyethylene bags.
4. 5-pound polyethylene bags.

The principal varieties included in this experiment were McIntosh, Red Delicious and Rome.

The price charged for each variety was held constant thruout the experiment. For example, McIntosh was priced at 11.7¢ per pound or 3 pounds for 35¢, 5 pounds for 59¢, two 3 pound bags with 1¢ discount for 69¢.

The increase in sales of the 5 pound bag over the 3 pound bag was 24.2 per cent. This indicated rather significantly that more apples can be sold in 5 pound units than 3 pound units and that consumers do not discriminate against the larger package.

Whether the 3 pound bags were printed or unprinted or sold in a combination pricing unit made no significant difference.

Why stay in a rut with the three pound bag when the five pound bag will sell more apples?

--- O. C. Roberts

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POMOLOGICAL PARAGRAPHS!

Girdled Trees

Contrary to what at least one grower was told trees leaf out and often fruit the first season after the bark and cambium layer are destroyed around the tree trunk! Recent observations, however, have revealed that the vigor of these completely

girdled trees vary considerably. On some trees the foliage and fruit appear normal; foliage may be light in color but fruit size normal on some trees; and on other girdled trees the foliage may be light in color and sparse and the fruit small.

The reason why completely girdled trees leaf out and often fruit the first season after the bark and cambium layer are destroyed around the tree trunk is because water and other materials which are taken up by the roots from the soil pass up to the leaves through the wood. In the leaves the water and the carbon dioxide taken from the air by the leaves are united chemically, through the action of sunlight, into glucose sugar. This sugar is the starting point for the synthesis of all other carbohydrates and in turn for proteins, oils, waxes, and other organic compounds which make up the bulk of the apple tree. After the manufacture of the plant foods by the leaves, they move to other parts of the tree through the phloem which is found in the bark. From the facts presented, it can be seen that complete girdling will not deprive the top of the tree of water and other materials necessary for the manufacture of plant foods and that these materials will be transported to all plant parts above the injured area.

Reserve food stored in the roots enable the roots to function for some time, often a year or two, thus keeping the top of the tree alive. However, a completely girdled tree, unless repaired, will eventually die from starvation of the roots for carbohydrates!

Russetting

The number of russeted apples evident in our orchards this year makes the maintenance of 90 to 95 per cent relative humidity in apple storages during the 1956 - 1957 storage period more important than ever. Russeted fruits shrivel readily! Lacking the cuticle which serves to protect the fruit against loss of water and various external injuries, evaporation and water loss from the russeted area are greater than takes place in non-russeted fruit.

---W. J. Lord

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LEGAL LIABILITY RISKS AND INSURANCE PROTECTION FOR FARMERS

In the previous two articles, I discussed the questions of personal liability and liability to employees. This discussion will outline the questions of motor vehicle liability.

MOTOR VEHICLE LIABILITY

As owners and users of automobiles and trucks on and off the farm, farmers may be held liable if operation of their vehicles results in personal injury or damage to property of others. Loss of drivers' license and registration plates can also result if you are involved in accident or law violation on public highways.

Under certain circumstances, farmers may also be held liable for the negligence of others whom they permit to drive. In general, the liability of an owner is extended to cover the liability of any person who is legally using the automobile with the permission of the owner.

Automobile Responsibility Laws

All states have motor vehicle safety and financial responsibility laws. These laws were passed to reduce traffic accidents by controlling irresponsible drivers. Under these laws, the driving permits and registration plates of financially irresponsible drivers may be withdrawn under certain conditions.

Ordinarily the most satisfactory way to satisfy the financial responsibility law is to secure automobile liability insurance.

In most states, the financial responsibility laws require security of \$5,000 for injuries or death to one person and \$10,000 for injuries or death of two or more persons with a limit of \$5,000 for any one person. The requirement for property damage is frequently \$5,000. These security requirements are known as 5/10/5 limits. Several states have increased their requirements for injuries or death to \$10,000 and \$20,000 respectively. A few states have set their requirements for property damage at a minimum of \$2,000 and others to \$5,000. The 12 states that require higher amounts of security than 5/10/2 are Connecticut, Maine, Vermont, New York, Maryland, Minnesota, Mississippi, Missouri, Ohio, South Dakota, Texas, and Wisconsin.

One of the more important advantages of using insurance to prove financial responsibility is that payments are guaranteed when loss or damage covered by a policy occurs. Usually the company is not relieved of its obligation under the policy, even if an agreement is reached between Policyholder and claimant or if the insured becomes bankrupt. The intent of the law is to make sure that the innocent injured victim is compensated. But it should be remembered that the right of states to legislate is limited to their highways. For example in Massachusetts legislation is limited to "the accepted ways of the Commonwealth".

Coverage

A company issuing a standard automobile liability policy agrees to pay up to the limits of the policy such claims as the insured may become obligated to pay because of liability imposed upon him by law. In addition, if a case goes to court, the insurance company furnishes the lawyer and pays all court costs. Liability must be clearly recognized or proved before the company is obligated to pay. If the insured motorist is found without fault in an accident, there can be no liability against him or his company, but any claim or suit will be defended by the company.

Standard automobile liability insurance policies provide two types of coverage:

- (1) Bodily injury
- (2) Property damage

Automobile liability insurance companies provide policies to meet the special conditions imposed by the motor vehicle financial responsibility laws of the various states, at least up to the amount of the basic coverage required in the state where the policy is issued. Higher limits are available to motorists who wish to protect themselves against judgements that might be higher than the minimum security required to be posted in their own or other states. Since Massachusetts has only 5/10 statutory requirements and surrounding states of Connecticut, Maine, New York and Vermont have higher requirements, higher limits would be desirable for many, if not all, Massachusetts motorists for proper insurance protection.

Most liability policies list as optional coverage:

(3) Medical payments

Under medical coverage, payments are made to anyone who is injured or killed while lawfully entering, riding in, or alighting from an insured automobile. The standard payment is usually \$500 to each injured person, to defray medical, hospital and nursing costs. In event of death, the payment may be applied toward funeral expenses. The amount of medical coverage may be increased with the payment of an additional premium. Medical benefits are not authorized if the injured person was acting in the course of his employment at the time of the accident and was covered by workmen's compensation insurance.

Under certain conditions, the automobile liability policy covers any liability of an owner for the negligence of another person whom he permits to drive.

Principally because a car is now often used by many people, both inside and outside the family, automobile liability insurance attaches to a specific car and follows it whether it is operated by the owner or is in legal use of a permitted driver, except when there is a change of ownership. In Massachusetts insurance is required as a condition of obtaining registration plates. In some other states when an insured car is traded in on a new one, the insurance on the old car applies to the new car for a period of 30 days. Any accident within 30 days is covered automatically. The insurance will lapse at the end of 30 days unless transferred to the new car.

Premium rates vary according to the amount of coverage, the liabilities included, the ages of the drivers, the use of the vehicle and the place of principal garaging of the car or truck. As with other types of insurance consult your insurance agent for details as to policy, rates and coverage.

This article does not cover questions and coverages of policies issued to provide insurance for damage to the motorist's car and death or injury to him. Content of this series of articles has been approved by insurance company representatives as an educational service.

---L. D. Rhoades

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THE COST OF A BOX OF APPLES

A series of three fruit growers' cost analysis meetings was held at Flerra's packing shed and storage in West Acton on the evening of February 20, March 15 and March 29. Growers' figures were used to make up a composite cost sheet on the basis of price per bushel of top grade apples. Yields were based on the total with ciders and B grades omitted and used as a cushion to make the paper figures more realistic. The figures presented here are not guaranteed, as they are composite, but they are accurate enough for a grower's comparisons in analyzing his own costs. They should give the consuming public a somewhat surprising picture of the cost of processing a box of apples completely through to the wholesaler.

The total gross cost per packed box of apples is \$2.49. This includes production, picking, handling into storage, grading, containers, storage, various selling charges, etc. It also includes such overhead items as shrinkage, depreciation, taxes, etc. The production costs, i.e., putting the ripe apple on the tree ready for picking, was averaged at 66¢, with the most expensive block being \$1.05. It is readily seen that the much-lamented production cost is only a little over 25% of the total.

This figure of \$2.48 or roughly \$2.50 per box we stress represents the gross selling price needed to break even. It also, as previously pointed out, is based on estimated yields of top grade apples. Furthermore, this is a wholesale figure. Delivery to the store and the legitimate retail mark-up would have to be added to translate the cost into terms of produce shopping.

The group felt that it was very interesting and helpful to set up such a set of figures and to try and pick out cost factors over which the grower might have the most influence or could do something about. In the history of fruit growing it has been consistently found that correct understanding and realization of one's individual cost-per-unit figures have been essential to success.

---Max G. Fultz

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ORCHARD MOUSE CONTROL SUPPLIES

Orchard mouse control supplies will be available as usual from the Rodent Control Fund, South College Building, University of Massachusetts or your local cooperating agency. Every year some fruit growers initiate this mouse control program at too late a date to successfully cover their entire orchard. Sometimes this is due to circumstances over which they have no control. There is not much we can do about spells of bad weather or a late harvest that extends way into frosty weather. Yet there are some things that are under our command. We have taken some steps at Amherst to provide you with prompt service at this end after we have received your order.

A new mixing machine has been purchased. This mixer is a heavy-duty model capable of continuous operation. Its capacity is such that any rush of orders will not overload it and it should perform well throughout the season.

The basis of our treated-oat baits is a large, high quality grade of steam-crushed oats obtained from the West. Other years we have had trouble in obtaining these oats, which always seemed to become lost enroute. The small size of our storage facilities in Amherst precluded obtaining a single shipment. This year, through the cooperation of the University, we have obtained a storage space of ample size to hold our season's supply. This larder is now stocked, waiting only for orders so that they may be filled with freshly-prepared bait.

What can the fruit grower do to prevent being late in poisoning the orchard? The one thing you can do is to order the supplies now from your usual source. If you have been ordering through a cooperator, let him know your needs now so that he may make up his combined order. If you order direct you may specify the day you wish your order to leave Amherst. All orders are shipped Railway Express, shipping charges collect.

---W. R. Jones

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POMOLOGICAL RESEARCH

14. A Study of the Tree Characters of Fruit Varieties

This project has been active since October 11, 1917. The question which immediately arises is "How can we justify carrying on a project for such a long period of time?" But if we examine the nature of the project the question can readily be answered. The purpose of this project is to establish the vegetative characters of fruit varieties so that mixtures may be detected in the nursery row, thereby materially reducing the number of misnamed trees which get planted in commercial orchards. So, as long as new varieties are introduced this project will need to be continued.

During the existence of this project bulletins describing the vegetative characters of apple, cherry, plum and pear varieties have been published. On the basis of these descriptions millions of fruit trees have been examined in eastern and mid-western nurseries for trueness-to-name since the inception of the project. The numbers of misnamed trees and mixtures found during this period is unknown but it could easily approach several hundred thousand and the savings to fruit growers and nurserymen could easily total many thousands of dollars.

While this project cannot be considered extremely scientific or spectacular, it has without question made an outstanding contribution to the fruit industry in the Northeast. This may sound like boasting to many of our younger fruit growers, but if they ask some of the old timers who planted McIntosh only to find that they had a "fine" orchard of Wolf River when the trees came into production, there will be little doubt as to the value of this project.

---W. D. Weeks

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LIQUID APPLES

Have you ever thought of cider as being liquid apples? Many times liquid apples can represent a liquid profit, also. Growers should consider all the angles when preparing to sell their crop, to determine which form will result in the greatest profit.

Let's consider for a moment the total return that can be gained from cider. The average bushel of cider apples will produce 3-1/2 gallons of cider, although this does vary. The average price at retail is 75¢ a gallon or a total of \$2.60 for a bushel of cider apples. From this return deduct the cost of growing the apples, the cost of labor and materials to produce the cider. The net profit compares favorably with that received from selling top grade apples. Take a little time and figure your own costs and see if cider will add to your profit.

In short crop years such as this, prices will be up, both for fresh apples and for cider. Keep in mind that there will be a temptation to sell more cider grade apples as fresh rather than as cider. By grading as you would normally and producing a good cider, you are building for the future.

The Cider Certification program is moving along well this year, but whether you are under it or not, cleanliness and sanitation are the important factors. The more thorough the sanitation, the longer your cider will hold up. Use of a detergent-sanitizer will help prevent quick spoilage. When possible store the finished product under refrigeration as it slows the growth of spoilage organisms.

Good cider production and high sales can be summed up in these points:

1. Use clean sound apples of two or more varieties
2. Follow a sanitation program
3. Refrigerate the cider
4. Price right

---K. M. Hayes

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THOSE GOOD OLD APPLE VARIETIES!

We frequently read articles in which the writer reminisces about those good old apple varieties. As a result of these articles, the fruit grower gets customers requesting some variety long since abandoned on his farm. Why was the planting of these varieties discontinued? A recent article in Farm Research titled "Apples of Yesteryear" by L. G. Klein of the Department of Pomology, Geneva, New York, discusses what happened to "those good-old apples varieties". The following summarizes this article.

Before the fruit industry became so highly specialized as it is today, most farms had a small apple orchard. In these orchards were a collection of many "fine old varieties". As the fruit industry became more specialized, many of the old varieties disappeared from the commercial orchards because they proved to be

unsuitable for "efficient large-scale production". These varieties were usually lacking in more than one of the following attributes considered by commercial growers to be more important than good quality: (1) productiveness, (2) attractiveness, (3) ease of handling, (4) disease resistance, and (5) good keeping and shipping quality.

"Why Old Favorites Fade Away"

Black Gilliflower (Sheepnose) - Unattractive dark dull color contributed to its failure to gain commercial acceptance.

Chenango - Extremely susceptible to bruising and has poor keeping quality.

Early Harvest - Small size, uneven ripening, bruises easily and has very short storage life.

Esopus Spitzenberg - Trees lack vigor, are unproductive and fruit attains top quality only under certain conditions of soil and locality.

Fameuse (Snow Apple) - Popular before the McIntosh era but soon became apparent that the McIntosh was superior in most respects, particularly in size and production.

Lady - Very small in size.

Maiden Blush - Uneven ripening, short storage life and poor dessert quality.

Mother - subject to winter injury, only fair production and tendency to be biennial bearing.

Porter - Uneven ripening and has tender flesh, very attractive to apple maggot.

Pumpkin Sweet (Pound Sweet) - Trees are not too hardy and are subject to sun-scald. The fruit is too large and coarse for dessert purposes.

Roxbury Russet - Unattractive color.

St. Lawrence - Not very high in quality, susceptible to scab and to premature dropping.

Seek-no-further - Frequently mediocre quality in some localities.

Tolman Sweet - Small size and not too attractive in addition to limited uses for sweet apples.

Tompkins King - Trees unproductive.

Wagener - Trees lack vigor as they reach maturity and are short-lived. Also, the fruits run small.

Yellow Newtown - Trees fail to thrive in most of regions in the Northeast.

--- W. J. Lord

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HIGHLIGHTS OF THE STRAWBERRY CONFERENCE AT NORFOLK, VIRGINIA

A group of growers, nurserymen, and scientists gathered at the Virginia Truck Crops Station at Norfolk, Virginia, on May 17, 1956, to look over the strawberry experiments and to talk over mutual problems. This was to have been a two-day conference with the second day spent at the U. S. D. A. - Maryland Experiment Station at Salisbury, Md. A severe frost on April 24 on the Eastern Shore of Maryland practically eliminated the crop. Therefore, the second day of the conference was cancelled. In spite of this, the attendance was good with participants coming from as far away as Florida and Michigan.

The Virginia Truck Crops Station is working on a wide variety of strawberry problems. Many have a wide application; others are peculiar to their situation. A few of those of general interest will be discussed briefly.

Black-root rot is a serious trouble in many strawberry sections. It is a soil-borne disease thought to be caused by nematodes or a combination of nematodes and fungi, and possibly bacteria. Soil fumigation appears promising for its control. A considerable number of both new and old soil fumigants were under test. Some of these are nematocides and some are both nematocides and fungicides. The plants in most of the plots treated with soil fumigants were larger and looked healthier than those in untreated plots. The best looking plants were in the plots treated with methyl bromide. Methyl bromide is a good nematocide and is effective in destroying some, but not all, soil fungi.

Some very interesting experiments were under way to find a good method to control summer growth and plant spacing. The results obtained from using the "hormone" type materials is not always predictable. Therefore, an attempt is being made to do the thinning with a dinitro type spray. While progress is being made with this method, much remains to be done before it becomes practical.

What is the best mulch for strawberries? This is becoming an increasingly serious problem in many areas where mulching material is becoming scarce and expensive. At the Virginia Truck Crops Station pine needles, peanut hulls, grain straw (chopped into short lengths with an ensilage cutter), chopped corn cobs, sawdust and shavings were under trial. Of these, they liked pine needles and peanut hulls best. Sawdust and shavings were liked the least because they require the use of more nitrogen and blow away too easily.

With their warmer winters winter weeds are a very serious problem, especially knotweed, chickweed, and henbit. They have found that under Virginia conditions a combination of one pound of Chloro IPC and two pounds of SES per acre applied twice, once in November and once in February, gives very good control. Combining this spray with the mulch application has proved very satisfactory. It was applied to the soil just before mulching, to the mulch before spreading, or on the mulch after spreading, with equally good results. The combination of Chloro IPC and SES used as a preplanting treatment killed the strawberry plants. When adsorbed on vermiculite it acted as if it were twice as strong and injured severely or killed the plants.

A number of materials, including both common fungicides and antibiotics, were being tested for fruit rot control. It is interesting that one of the antibiotics increased the shelf life of strawberries by several days as well as giving good rot control.

Several new varieties and selections were under test. The new variety Pocahontas has been very outstanding in vigor and production. Of the new selections, US 2233 was outstanding. It will probably be named and introduced this fall. An early ripening selection, US 3939, in season with Midland, looks very promising and is being seriously considered for introduction.

Other things under investigation are time of planting, kind, rate and time of fertilizer applications, insect control, storage of plants, and plant spacing.

---J. S. Bailey

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THE WELLINGTON - A NEW EARLY APPLE

The Wellington is the latest apple variety named by the Experiment Station at Geneva. It resulted from a cross of Cortland by Crimson Beauty in 1924, and was named in honor of Professor Richard Wellington who for many years was in charge of the fruit breeding work at the Geneva Station.

Experience at the Geneva Station indicates that Wellington is an annual cropper, has no tendency toward biennial bearing, is an early variety, ripening 4 to 5 days after Crimson Beauty and 8 to 10 days before Melba or Duchess. It blooms within a day of McIntosh and should be an excellent pollinator for early blooming varieties such as Melba, McIntosh, and Delicious.

The Fruit

The Wellington Apple is handsome - attractively red-streaked and of large size. It ripens evenly, may be picked at one time, hangs well to the tree and it is not subject to bruising. Also it can be held in storage for a month and still be acceptable for fresh market sales.

Although the Wellington cannot be rated high in quality, it is considerably better than Duchess. It's flavor is mildly subacid and is probably of better quality than any other variety of its season. However, it does not have the high dessert quality of Melba. Preliminary processing tests have shown that Wellington makes good sauce.

The Tree

The Wellington tree is of an upright spreading type and the branches have desirable wide crotch angles.

The Geneva Experiment Station is of the opinion that Wellington is worthy of extended trial where a variety of this season is wanted. "Its attractive appearance and earliness should make it a valuable variety for early fresh market sales, while its large size and even ripening of its fruit enhance its commercial adaptability."--April, 1955 Issue of Farm Research.

---W. J. Lord

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

OCTOBER 15, 1956

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- The Present Status of Controlled Atmosphere Storage
- Apple Sorters' Manual
- What Fertilizer Element Does the Cultivated Blueberry Need Most?
- Twenty-nine Percent
- Holiday Time is Apple Time
- Approved Farm Stand Program
- Sixty-one Percent



Issued by the Cooperative Extension Service, James W. Dayton, Associate Dean and Director, in furtherance of the Acts of May 8 and June 30, 1914; University of Massachusetts, United States Department of Agriculture and County Extension Services Cooperating.

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- Southwick, Franklin W. - Professor, Research
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- Weeks, Walter D. - Assistant Professor, Research
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RESEARCH ON THE BIOLOGY AND CONTROL OF
ORCHARD INSECTS AT THE WALTHAM FIELD STATION

When the original orchard at the Waltham Field Station was planted in 1926, it consisted of 12 trees each of the New England Seven varieties set in adjoining rows so that sprays applied to rows would show the pest control, foliage injury and fruit russet from a pesticide treatment on each of these varieties. Since then, rows of Golden Delicious, Macoun, Kendall and a block of miscellaneous varieties have been added. Recently, about 70 trees mostly McIntosh, Cortland and Delicious were planted, and when these reach bearing age, many of the older trees will be removed to release the land for other use. In addition, there is an orchard of about 60 trees consisting of Baldwin, Golden Delicious, Starking and Macoun on Malling Stock III, IV and V which was planned by Dr. J. K. Shaw before his retirement.

These trees are used entirely for pest control studies, a part by the Department of Botany under the direction of Dr. E. F. Guba and a part by the Department of Entomology under the direction of Prof. W. D. Whitcomb.

Early in the work, the orchard was found to have an extremely high infestation by the plum curculio often suffering 85 - 95% stung fruit on trees unprotected by an adequate insecticide. Consequently the insect work has emphasized the evaluation of materials and spray schedules for curculio control.

This work is organized under State Project - Entomology 5023. Studies in this project have developed methoxychlor into the No. 1 insecticide to control heavy infestations of the plum curculio and shown that it is compatible with the common fungicides and miticides. It was found that dieldrin was effective against curculio at the amazingly small dosage of 1/4 pound actual toxicant in 100 gallons, but that this insecticide had no value against codling moth. Although the organic phosphates such as parathion, EPN and malathion kill the beetles, they have a short residual period and are unsatisfactory unless applications are repeated each 4 or 5 days.

By omitting some of the regular sprays, it was found that the calyx application was the most important in 1955. This is contrary to the general belief that the 1st Cover spray is most timely and the tests will be continued.

New insecticides are evaluated each season. Our trials have shown unsatisfactory control of curculio from TDE, which is closely related to methoxychlor; from endrin, which is closely related to dieldrin; and from diazanon, a phosphate similar to parathion.

A new insecticide called Guthion which has shown promise for the control of both insects and mites will be tested for its effectiveness under Massachusetts conditions and its compatibility with common fungicides.

Emergence cages for apple maggot flies to aid in timing insecticide applications to combat this destructive insect have been operated for many years and similar cages for use by Agricultural Agents in nearby counties have been stocked. The effect of soil insecticides on the emergence of apple maggot flies has been studied and a practical treatment with dieldrin and similar materials has been developed for use in small areas where infested apples have been stored.

---W. D. Whitcomb

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WHY DO OWNERS OF A FARM BUSINESS NEED A WILL?

Many successful farming businesses have been forced into a sale because the owner died without having made a proper will. Such a situation is wasteful, unfortunate, and unnecessary. A will, soundly planned and correctly executed will avoid many problems and help to continue a farming business. The cost of having a good will drawn and kept up to date is not high.

Settling an Estate Costs Money

Small estates need just as careful planning as larger ones. The tax costs and other expense may not be so large, but the possible shrinkage is higher in proportion in the smaller estates - due to costs of administration, and losses due to lack of prompt and experienced attention to affairs of the farming business.

Things To Consider

The owner of a farm should provide, through a will, for his executors to carry out any agreements made during his lifetime for the sale or other disposition of his farming business. Or, in the absence of such agreements, to continue the operation of the farm during the period of settling the estate, at the risk of the owner's estate.

Sometimes it might be proper to plan for sale of farm equipment and livestock and feed and supplies and for keeping the real estate to be rented as an income asset for the beneficiaries.

A definite requirement that the executors sell or liquidate the farm business may or may not be advisable. The gains from continued operation need to be compared with the returns from sale. When the word gets around that the farm and personal property must be sold the market value often drops very rapidly.

Courts having control over the settling of estates often order the estate assets to be converted into money, in the absence of specific authorization to continue the business.

Authority of Executors

Consideration should be given to giving the executors specific power to hire managers, agents, consultants, accountants and sales brokers as well as authority to continue the operation. Power to the executors to vote shares of the corporation in whatever manner is deemed advisable, when the business is incorporated, should be provided in the will. The Executors should be given authority to select or vote for the appointment of themselves or others as managers, officers or directors.

The will should also provide that any of these persons may at the same time, be officers, directors or employees of a corporate executor, such as a trust company or bank.

The executors should be authorized to borrow money in order to assure the profitable operation of the business without interruption.

Use of Trustees

In Massachusetts, when there is no will, the surviving spouse inherits one-third of the estate and the children inherit two-thirds. If the children are minors, it will be necessary to have guardians appointed and here again the court may well direct the sale of the farming business during the guardianship.

If minors are to inherit, it is often wise to appoint a trustee under the will to hold and manage the property - at least until the minor children come of age. A simple trust arrangement will often prove far more effective and practical than a guardianship. For example, a guardian must furnish a bond, but a trustee need not do so. A guardian must petition the court (involving legal expense to the estate) for authority to act. Such costs can be avoided by providing proper power to the trustee.

Setting up a trust arrangement under the will may be the best way to assure continued operation without conflict where several children (minors or not) and various other beneficiaries are involved. A trust arrangement can be worked out to guarantee the trustees all the powers and discretion they may need to continue the business.

Tax Considerations

A good many small farming businesses are owned jointly by husband and wife, father and son, two brothers or the like. In those cases, the wills of the owners can have a direct bearing on the taxes levied upon the estate and the business. The relationship of the will and taxes should be clearly understood. An owner should consider taxes in relation to wills and estate planning. Tax problems are complex and expert advice should be sought. In particular the appraisal of estate assets (farmer's property) made in connection with the probate of a will or administration of an estate should be considered carefully.

Most estates will have various depreciable assets, such as buildings and equipment, which may be held or disposed of according to the provisions of a will. When the property is appraised (valued) in connection with the will, there seems frequently to be a desire to get an appraisal "as low as the law permits." Actually, a market-value appraisal is desirable. The appraisal can have far reaching effects upon later allowable depreciation, and hence, on net income and future tax liability of the farming business. It is important to get a completely fair judgment of values. The average estate-tax rate (if a tax is due) on the deceased person's half may prove to be more economical than future capital gains tax.

In addition, when inventories in an estate such as crops or feed and supplies are appraised at the selling price, this can avoid ordinary income tax on the operating profit.

Family Corporations

The comments just made on appraisals of assets for Federal estate tax purposes do not apply to corporations. Only the capital stock itself in the case of corporations acquires a new adjusted-cost basis.

The owners of a farming business may well want to consider the advantages of incorporation to preserve the continued operation of the business after the death of the principal owner. If tax factors warrant, the owner may direct or authorize his executors to incorporate the business at his death and distribute the stock to his beneficiaries. Note here that the stock is to be distributed not its value.

Properly planned "buy and sell agreements" on business interests, to take effect on the death of the owner offer many worth while savings in values, time, effort, and tax liabilities, particularly on family farming corporations.

Good Planning is Important

Allow time for adequate thought and planning of these problems. Get the best professional advice from an attorney, accountant, and insurance advisor as well as your banker.

Sound and appropriate wills are seldom developed the first time. Have every will that is prepared, properly executed; each one is better than having no will at all, and is usually better than any former will. To be legal, a will must be written, witnessed, and signed according to strict requirements fixed by law. The drafting of a will calls for technical skill. To reduce the risk of error and misunderstanding, you need the professional help of an attorney.

Make it a habit to revise your will as often as you revise your other insurance coverage.

Acknowledgement is made for source of some of the material used in this discussion to the Small Business Administration-Small Marketers Aids.

---L. D. Rhoades

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THE CONTROL OF FALL AND WINTER WEEDS
IN STRAWBERRIES WITH CHEMICALS

Chloro IPC has been recommended for several years for the control of fall and winter weeds, especially chickweed, in strawberries. This material has given very satisfactory results and has been considered safe when applied at not to exceed two pounds per acre in the fall, winter, and early spring. At least no damage has been reported by Massachusetts growers.

Therefore, it was surprising to learn that CIPC has caused injury to strawberries in New Jersey and Michigan. The injury in Michigan was especially severe. It occurred in all parts of the state where CIPC was used and reduced yields 50 to 100 percent. As a result, CIPC will not be recommended in Michigan until the reason for this damage is known and methods for the safe application of CIPC are worked out.

What can be substituted for CIPC? Is a dinitro the answer? Unfortunately, the answer to this must be no. Michigan growers had trouble with DN applied in the fall of 1954. An occasional case of injury has occurred in Massachusetts.

Until we find out the reasons for these cases of injury it would be better not to use CIPC or DN for fall or winter weed control in strawberries.

---J. S. Bailey

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COMMENTS ON OUTSTANDING FRUIT VARIETIES

On the third Thursday of September each year the Annual Meeting of the New York State Fruit Testing Association is held at Geneva, New York.

This meeting affords an opportunity for those interested in fruit varieties to see a large assortment of varieties of various fruits and to compare notes on the merits of some of the newer sorts. It was my privilege to attend the meeting this year and this is a report of some of the impressions which I recieved.

With respect to apple varieties the emphasis seemed to be given to those which ripen early. Among these Puritan and Wellington received particular attention. In a collection of new varieties Puritan was fully as attractive as any on display and received many favorable comments as a desirable variety ripening about mid-August.

Wellington is a large attractive apple which ripens at about the same season as Puritan. It has particular merit as a processing variety and has a strong tendency towards annual bearing.

Two new seedlings show considerable promise. These are N. Y. 17207 and N. Y. 4111. N. Y. 17207 is a cross between Haralson and McIntosh. It is a firm attractive apple ripening in the Wealthy season. It appears to be a sort that would handle well.

N. Y. 4111 is a cross between McIntosh and Cox Orange. This seedling is attractive, has excellent quality and ripens a week after Early McIntosh.

While time did not permit an exhaustive discussion of peach varieties, mention was made that Kalhaven is being recommended as a desirable variety ripening between Halehaven and Elberta.

A new pear seedling (N. Y. 4885) was on display. This is a very productive Bartlett type ripening between Bartlett and Gorham. It is a cross between Bartlett and Ewart. Trees of this seedling are available from the New York Fruit Testing Association.

The Cook grape was on display among the grape varieties and received favorable comment.

The afternoon was devoted to a tour of the Experiment Station plantations during which we were shown thousands of seedlings and named varieties of various fruits covering an area of five hundred acres. .

---O. C. Roberts

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THE PRESENT STATUS OF CONTROLLED ATMOSPHERE STORAGE

As most of you are aware, the growth of controlled-atmosphere (C.A.) storage has been quite rapid since 1950. In a recent report written by D. G. Dalrymple, Cornell University, on Marketing Controlled Atmosphere Apples, he notes that commercial C. A. storage capacity has increased so rapidly that present capacity is roughly 10 times what it was in 1950. In New York State there is sufficient C. A. storage capacity to hold approximately 10% of that state's McIntosh production.

In Massachusetts the growth of C. A. storage has been sufficient during the past five years so that New York represents the only state with greater capacity in this type of storage than we have now. This fall the number of C. A. rooms in Massachusetts is 13 with capacity for approximately 110,000 to 115,000 bushels. Good apples from our C. A. storages have generally been well received and have been sold at premium prices. The rapid growth in C. A. storage capacity would not have occurred if this were not so.

So far, the vast majority of the fruit stored in such rooms has been McIntosh. However, about 75,000 bushels of Red Delicious are being held in a few rooms in New York. Also, smaller amounts of Rome and Golden Delicious have been stored in this fashion.

Michigan, which represents the other important McIntosh area in this country, will have several rooms operating this fall. Also, a few such McIntosh rooms are operating in Canada. It may be expected that since a fairly large number of commercially important apple varieties respond favorably to C. A. storage, other sections of this country will eventually get into this type of storage. Important Red Delicious producing areas in the Shenandoah-Cumberland region and in Washington State may eventually build C. A. rooms for this variety. In California one baby food processor is much interested in C. A. storage for Yellow Newtowns so that this variety can be handled by their processing plants throughout the year.

---F. W. Southwick

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APPLE SORTERS' MANUAL

Do you have a copy of the Apple Sorters' Manual in your packing shed? It is a useful aid in training or re-training personnel for grading apples for it gives interpretations based upon United States Grades for Apples. Copies of the Apple Sorters' Manual can be obtained through your County Extension Service or the Pomology Department, University of Massachusetts, Amherst, Massachusetts.

---Editor

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WHAT FERTILIZER ELEMENT DOES THE CULTIVATED BLUEBERRY NEED MOST?

The question of the how and what in fertilizing cultivated blueberries has been discussed on several occasions in Fruit Notes. Recently, in the Nov.-Dec., 1955, and the March, 1956, issues reference was made to a nutritional survey in fields of cultivated blueberries throughout the state. The purpose of the survey was to find out how several of the most important chemical elements vary in the leaves under actual growing conditions. The field work for this survey was conducted in the summer of 1955 and the chemical analysis of leaves made in the winter of 1955-56.

Thirty-three blueberry plantings situated all over the state were visited. These fields represent a wide range in bush vigor, soil-type, soil management, cultural practices, fertilization, soil moisture, and climatic conditions. Ten bushes which were considered representative were selected in each field. The growth made in 1955 of ten shoots on each of the ten bushes was measured and averaged. Forty leaves were picked from each bush, made into a composite sample, dried and analysed for nitrogen (N), phosphorous (P), potassium (K), calcium (Ca), and magnesium (Mg.).

The results are given in the following table:

	Average shoot Growth in inches	Percent in leaves (dry weight basis)				
		N	P	K	Mg	Ca
Highest value	19.2	2.25	.12	.61	.26	.69
Lowest value	4.3	1.13	.07	.33	.11	.36
Average all fields	11.3	1.76	.09	.42	.18	.48
5 good fields	13.5	1.72	.10	.43	.19	.49
5 poor fields	7.3	1.57	.09	.40	.18	.49
5 cultivated fields	13.7	1.81	.10	.48	.16	.48
5 sod fields	14.4	1.71	.09	.42	.17	.45

The highest values for the several elements were not all from the same field. Neither were the lowest values. These values do not necessarily represent the maximum range but are probably somewhere near it. Nor should the averages be taken as the most desirable values. They are merely a handy point of reference.

To get a better idea on the effects of vigor of growth on leaf element content, five of the best and most vigorously growing fields were selected and compared with five of the poorest. It is interesting that, although the average shoot growth of the bushes in the five best fields was nearly twice that in the poor fields, nitrogen was the only element which varied enough to appear significant.

When five cultivated fields were compared with five sod fields, the difference in growth was slight and again the only element in the leaves which varied to any extent was nitrogen.

From these data it appears that leaf nitrogen is the element most likely to change significantly under different growing conditions. Experimenters in Michigan

reached the same conclusion by a slightly different method. They selected good and poor bushes in the same field and analysed the leaves for quite a number of elements including some of the trace elements. They also found that leaf nitrogen was the only element which varied significantly.

The results of these analyses are not such as to allow any sweeping conclusions. They do suggest that, unless an abnormal condition occurs to make some other element deficient, nitrogen is the one most apt to be lacking. Therefore, a nitrogen application would be most likely to result in increased growth. Other elements may influence growth and yield through their effect on the absorption and utilization of nitrogen as well as by their direct effect.

---J. S. Bailey

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TWENTY-NINE PERCENT

The Packing House Survey conducted by Professor O. C. Roberts during the winter of 1955-1956 revealed:

Twenty-nine percent of the apples that graded below U. S. Fancy failed to meet the color requirements for the grade.

Approximately three times more apples failed to grade U. S. Fancy because of color than due to pest damage. The same was found to be true in the 1954-1955 survey.

What Are You Going To Do About It?

Put an apple with the right kind and amount of color as a minimum in front of those grading as a guide.

Check packed containers at least once or twice a day to be sure your standard is being maintained.

---W. J. Lord

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HOLIDAY TIME IS APPLE TIME

Three Seasons of Opportunity! - - Halloween, Thanksgiving and Christmas.

Holiday time is apple time - - but people can not get and enjoy apples that are locked up in a storage. Neither, in these times, will any product sell unless some push is put behind the selling. Holiday time is a good time to push apple sales.

Those of you who sell to retail stores and direct to consumers have a special opportunity.

You can work closely with food retailers to put up special displays. You can arrange for window displays in clothing stores, restaurants, dry goods stores and banks. Special displays are a real problem to them. Help them out by offering to furnish some apples, corn stalks, some pumpkins, fall foliage and some apples. It will help both of you.

Those of you who sell direct to consumers can decorate your sales room in the spirit of the holiday. Really do it up brown. This is the time for large displays of your regular packages and special displays of special containers. Gift containers are saleable. So are special arrangements for the living and dining room table. "Apples for bobbing" - - "Apples for eating" - - "Apples for pies" - - "Apples for holiday desserts" - - "Apples for television treats".

Give 'em the ideas and sell 'em the apples! Make the holidays really holler!!

Holidays can be bright spots in a season of good selling if you put an enthusiastic spark in your sales promotion. That spark must come from you.

---F. E. Cole

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APPROVED FARM STAND PROGRAM

With the receipt of the most attractive signs from the manufacturers, the Massachusetts Fruit Growers Association Approved Farm Stand Program has gotten off to a good start.

Each of the ten growers who made initial application for use of the sign have as a part of the program, agreed to be guided by the following Code of Ethics in the conduct of their stand business.

Code of Ethics for Approved Farm Stands

To all customers:

The undersigned has agreed to operate this roadside stand or farm sales room in accordance with the following Code of Ethics:

1. To maintain the stand, stand surroundings and signs to present a neat and attractive appearance.
2. To feature local items, with at least 60% of items sold to be produced by stand operator.
3. To display only products in good firm usable condition.
4. To use only clean containers.

5. To use a grade mark on all products whenever official grades are available for the product and to have the product under a grade mark qualify under the grade indicated.
6. To pack all containers with at least the weight or volume common for the package and to have the face of each package represent the contents of the package.
7. To have the name and address of the operator on or in each container.
8. To have items on display plainly priced, with neat readable signs.
9. To state the variety and grade when advertising price in newspapers or on the radio whenever official grades are available.
10. To treat all customers with courtesy and consideration favorable to the development of a good reputation for the Approved Farm Stand sign.
11. To display the APPROVED FARM STAND CODE OF ETHICS in a prominent place in the stand at all times.

The benefit to be derived from this program which is aimed at increasing consumer confidence in fruit and other produce purchased at the farm is great both from the grower as well as consumer stand point. The more growers who come into it the greater will be the benefit to all.

---A. P. French

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SIXTY-ONE PERCENT

The results of the Packing House Survey conducted during the winter of 1955-1956 showed:

Mechanical injury amounted to 61 percent of the total cause of apples being below the grade of U. S. Fancy.

Mechanical injury amounted to five times pest damage.

What Are You Going to Do About It?

Time spent checking the grading and packing operation will pay dividends.

Have you ever checked the condition of apples in your packed containers?

Is your grading and packing equipment or grading personnel causing much of this mechanical injury?

Where is the Excessive Amount of Bruising Occurring?

Dropping of boxed apples on the floor, pallets or when loading or unloading the truck.

Fast or rough dumping of apples onto receiving belt of the grader.

In the apple brusher - cleaner brushes and buffer clothes may be covered with wax which accumulates dirt that bruises the apples.

Running a brusher too fast and with too few apples.

Fruit rolling down an incline and striking a sharp unpadded corner of the grader.

During a change in elevation such as when the apples roll from the sorter onto the sizing chain of a chain sizing unit.

When the apples are spun into a rotary bin by the rubber-tube ejector unit of the revolving wheel grader.

Filling bins too full.

Pulling apples down in a bin.

When the fruit is transferred to a unit moving at a much different rate of speed.

Belt burn when too many fruits are on a moving belt.

Too many fruits being forced through the grader at one time.

Packing personnel dropping apples into the packages.

Lidding overfilled boxes.

Stacking boxes that are too full.

Rough jouncing to settle apples in a bag.

Cartons are good but they should not be thrown.

---W. J. Lord

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The first part of the paper discusses the importance of the study and the objectives of the research. It then proceeds to a literature review, followed by a description of the methodology used in the study. The results of the study are presented in the next section, followed by a discussion of the findings and their implications. The paper concludes with a summary of the main points and a list of references.

FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

NOVEMBER – DECEMBER 15, 1956

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LIMING ORCHARD SOILS

The soils in Massachusetts are naturally acid. In most productive soils the soil acids, clay and humic acid, are combined with bases such as calcium, magnesium and potassium.

Soils become progressively more acid and less productive as calcium, magnesium and potassium are lost from the soil by leaching and/or by crop removal. The harmful effect of this acidity on crop yields has been mainly attributed to excessive quantities of hydrogen ions, soluble aluminum, manganese, iron and to deficiencies of calcium, phosphorus or other essential nutrients.

Many agricultural practices speed up the acidification of the soil. In orchards the continued use of sulfur to control fungus diseases will increase soil acidity and accelerate the leaching of calcium, magnesium and potassium. Orchardists using sulfur and following the current pest control schedule for apples may use 200 to 300 pounds of sulfur per acre per year. Since it takes approximately three pounds of limestone to neutralize one pound of sulfur, knowing how many pounds of sulfur compounds he buys for the year and the per cent sulfur in these compounds, the grower can figure the approximate amount of lime it will take to neutralize the acidifying effect of the sulfur.

In addition to sulfur, several of the common nitrogenous fertilizers produce residual acidity. Ammonium sulfate produces the most residual acidity of the common nitrogen fertilizers. It takes 110 pounds of limestone to neutralize the acidity developed by the use of 100 pounds of this compound. Ammonium nitrate and urea, also, have an acidifying effect on the soil.

Effect of Lime on the Orchard Soil

Chemically, lime brings about many complex changes in an acid soil. If added in sufficient amounts, limestone corrects soil acidity and eliminates aluminum, iron and manganese toxic conditions. Overliming may create iron, boron and manganese deficiency. These deficiencies, however, would probably occur only if the soils were limed above the neutral point (pH 7.0). By decreasing iron and aluminum, phosphorus becomes more available. In addition, liming soils increases the calcium and magnesium (when magnesium-containing lime is used) content of the soil.

Biologically, lime influences soil organisms thereby increasing the activity of the soil organic matter and nitrogen. The rate of turnover of these constituents is more important than the actual amounts present. Decay and ammonification are markedly speeded up by liming an acid soil. Nitrogen-fixation bacteria are stimulated and nitrification, the change of ammonia nitrogen to nitrate nitrogen, proceeds more rapidly.

Physically, lime may improve the physical structure of soils.

Testing Soils For Acidity

Soil tests are useful for the determination of lime needs in orchards. Without a standardized sampling procedure, however, and careful adherence to this procedure, the value of the soil sample is negligible.

When to Sample

Soil samples may be taken any time the soil isn't frozen. The results of soil samples taken after harvest, however, are useful for determining the amount of lime to apply in late fall or winter months, the usual time lime is applied.

Method of Taking Soil Samples

1. If there are two or more distinct soil types within the orchard block being sampled, each should be sampled separately. The same is true if portions of the block have received different lime and fertilizer treatments.

2. Sample each soil type as follows:

- a. Scrape away the mulch and grass from the area to be sampled under the dripline of the tree.
- b. Take the soil sample with an augur to the full depth of the surface soil as shown by the change in color.
- c. In place of an augur, a spade may be used. Care should be taken to take a slice of uniform thickness, top to bottom. First expose the surface soil to its full depth, then cut off a slice about an inch thick. Break or cut the side of the slice to produce a column one inch thick and about two inches wide and as deep as the surface soil depth.
- d. Take one boring or soil slice beneath the dripline of each 10th - 15th tree in a block. After obtaining five such borings or soil slices, place them in a clean container such as a pail and mix thoroughly. From this composite sample remove about 1 cupful of soil for the test. If the soil is wet and soggy, place on wax paper and air dry. Place the composite soil sample in a clean container such as an ice cream container or a tobacco can.
- e. Repeat process described in 2-d until the whole orchard block has been sampled.
- f. Label each container with date, owner of farm and orchard name or number.
- g. In many instances a subsoil sample should be taken. To do this enlarge the hole from which surface soil sample was taken and bore or dig into the subsoil. The sampling procedure is the same as that for the surface soil.

3. Acidification caused by sulfur spraying or dust is greatest under the trees. Therefore, the need for lime is greatest in this area. In order to evaluate the lime application procedure, sample the soil within three to four feet of the trunk. One composite sample obtained as described in 2-d should be sufficient.

Kind of Lime to Use

Magnesium deficiency can be found in many orchards in Massachusetts. A survey conducted in 1953 to obtain data on the nutritional status of orchards in Massachusetts revealed that magnesium was below the desirable range in 40 per cent of the orchards surveyed. Therefore, the orchardist should use a magnesium limestone preferably one which contains at least 20 per cent magnesium oxide (MgO). Such applications of high magnesium lime not only reduce soil acidity, thus increasing the availability of soil nutrients already present in the soil, but they also add magnesium and calcium which are necessary for plant growth.

When to Lime

Lime may be spread any time the soil is firm enough to support the spreader equipment and when it can be done without knocking off fruits. Generally it is spread during the winter months.

How Much Lime

It is desirable for orchard soils to be in the pH range of 6.0 to 6.5. However, the attainment of the pH in orchards having soil more acid than is desired will be a slow process because lime penetrates soil slowly.

First, the orchardist should have his soil tested to determine the lime requirement. Since experiments have shown that heavy applications of lime penetrate more rapidly than lighter applications, the lime required should be applied in one application. As much as 5 to 6 tons of lime may be applied in one application if economically feasible.

Under the present (1956) Agricultural Conservation Program: "No soil test is needed for applications of 2 to 3 tons of lime per acre. A soil test is required if more than 3 tons or less than 2 tons per acre are to be applied." In the majority of the Massachusetts orchards, however, more than threetons of lime per acre are needed.

After the initial application of lime, the soil should be retested in 3 to 5 years and additional lime applied if needed. Once the desired pH is attained, it may be expected to be maintained by an application of one ton of lime every five years. This may vary with soil type, however. Sandy soil requires more frequent use of lime but requires lesser amounts than heavier soil types.

If the trees have magnesium deficiency, due to the slow penetration of surface applications of dolomitic lime, a complete control of this disorder may not be effected for 3 to 5 years. In the meantime supply magnesium to the leaves, by applying epsom salts at the rate of 20 pounds per 100 gallons. Two or three applications should be made starting with the calyx or first cover spray.

Spreading the Lime

The most popular method of spreading lime is with a lime-spreading truck. Taking everything into account, many fruit growers consider this the most economical way of getting lime spread. However, the fruit grower should supervise the spreading operation.

Lime spreading trucks are usually hopper-shaped with an endless or screw-type conveyor located in the bottom. This conveyor moves the lime back to the spreading mechanism mounted on the rear of the truck. These mechanisms are of two main types: the fan or spinner type, and the transverse-conveyor type. For liming orchards the former type of spreading mechanism is preferred. In this type of spreading mechanism, the conveyor in the hopper delivers the limestone onto two rapidly rotating circular fans or spinners with radiating vanes that throw the lime out. Some lime trucks have a metal plate under the two spinners which enables the throwing of a larger proportion of the lime under the trees where it is needed most.

Some fruit growers still do their own spreading using a lime sower, fertilizer distributor or other types of distributors. Whatever type is used the emphasis should be placed on getting the largest proportion of the lime under the trees where the need is greatest.

---W. J. Lord

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WATER CORE OF APPLES

It has been noted by growers this year that Delicious apples and strains of this variety were suffering from a considerable amount of water core at harvest time. This disorder always develops while the fruit is on the trees and has generally been considered to be most serious on various apple varieties as the fruit approaches maturity or definitely becomes overripe. Most authorities have indicated and data have shown that this disorder is most prevalent in areas or seasons of intense sunlight and high temperature. The fact that water core is prevalent on our Delicious this year seems surprising in view of this general concept that high light and high temperature are primary causal factors since we've just experienced a cool growing season and the fruit was not overripe from the standpoint of flesh firmness.

However, H. A. Schomer working for the U.S.D.A. at Wenatchee, Washington, has noted recently that temperatures near 30°F. during the harvest season may help to induce the development of water core, also. This cool harvest season effect and later than average harvesting of the variety may be important reasons for the presence of water core in some of our Delicious this year.

Water core is, also, most apt to occur in apples that are grown on trees that are carrying less than a full crop. Large apples are more susceptible to water core than small ones. Certainly, many of our Delicious trees were not carrying a large crop and the average fruit size was greater than usual this year.

The question of what can be done about water core and how the fruit should be handled is of some concern to many growers. Studies on water core indicate that if the disorder is not too severe it may largely disappear in storage. Generally the rate of disappearance is faster at field temperatures than at 32°F. However, Delicious held at warm temperature will ripen and soften faster than

fruit held in a refrigerated storage. A study in Michigan published in 1930 by R. E. Marshall indicated that about 75 percent of the water core present in Delicious at harvest disappeared after 11 weeks in cold storage.

However, it should be remembered that severe water core may not disappear, no matter how the fruit is stored. Also, fruit that has had this disorder is much more subject to internal breakdown in storage even after the water core has disappeared. Hence, it seems to us that if your Delicious were suffering from a considerable amount of water core at harvest time that the fruit be disposed of fairly early in the marketing season. We suggest that storage operators check their holdings of Delicious regularly (large apples especially) so that serious development of internal breakdown in this variety does not occur prior to sale. It would be desirable to observe fruit after it has been held a week at room temperature rather than to limit your observations to fruit under refrigeration.

---F. W. Southwick

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HOW CONSUMERS BUY APPLES

Michigan State University has recently issued a bulletin entitled "Consumer Purchases of Apples in 1953" by J. D. Shaffer and G. G. Quackenbush. The following interesting information is found in the summary and conclusions.

1. The U. S consumption of apples has been declining at the rate of about 1 pound per person per year since 1920, based upon a straight trend line.
2. In 1953, panel families' purchases of fresh apples amounted to about 16 percent of their expenditures for fresh fruits and about 8 percent of the total spent for fresh fruits and vegetables together. Apples were third in dollar volume among the fresh fruits and vegetables; only bananas and potatoes received greater expenditures.
3. Apple sales are highly seasonal. For the 1953-1954 crop year, over 20 percent of the apples purchased during the year were bought during October; about 50 percent were bought during the 12 weeks starting September 6.
4. During the year, 35 percent of the apples were purchased in units of 5 pounds or less. Less than 8 percent were bought in 6-pound units. Almost 50 percent of the apples were purchased in units larger than 10 pounds. Since the typical retail grocer seldom handles units over 10 pounds, this indicates that a large portion of the apples are retailed through other channels.
5. There is an important seasonal difference in both the average size of purchase and the distribution of size of apple purchase, indicating that the optimum size of pre-packaged units varies during the season. Similarly, the fact that larger families tend to buy in large quantities per purchase indicates that a variety of package sizes to meet the needs of different families should be made available for maximum total sales.

6. Large variations in apple purchases existed between families. Quantities purchased varied from 0 to 372 pounds per family for the year. One-fifth of the families bought 47 percent of all the apples purchased.
7. Annual quantities purchased per person varied from 0 to 150 pounds. The top 20 percent of the families buying the most apples bought 68 pounds per person, compared to only 6 pounds for the 20 percent of the families buying the fewest apples per capita. If the average consumption could be increased to that of the one-fifth of the families buying the most apples per person, consumption would be increased by over 230 percent.
8. The range in expenditures per person among families was from \$0 to \$11. The one-fifth of the families spending the most for fresh apples per person spent 210 percent of the average expenditure, compared to 23 percent for the lowest group.
9. Total quantities bought per person were related to both frequency of purchase and quantity bought per purchase. The fifth of the families buying the most apples per person bought apples about three and a half times as often and in quantities about three and a half times as large per purchase as did the fifth of the families buying the smallest quantity. This indicates that one way of expanding sales would be to extend the period when apples are available at usual shopping places, thus increasing the number of purchases during the year.
10. The range in average price paid for fresh apples was from 2.7 to 20.5 cents per pound. The fifth of the families paying the lowest prices purchased in larger than average quantities and with less than average frequency; they spent an average amount for apples, but bought a much larger than average quantity per capita.
11. There was some indication that families with higher incomes per capita bought more apples per person than those with lower incomes, and that one and two member families bought more apples per person than larger families. However, the correlation between per capita purchases and these family characteristics (age and education of the homemaker, per capita income and size of family) is very low. The same is true in respect to total expenditures for all apples. Neither income nor the other factors appear to be as important as individual taste in explaining the large variations in consumption.
12. The following tabulation shows the percent of families who did not buy particular processed apple products during the year.

Product	Percent buying none during entire year
Canned apple sauce	50
Apple cider	68
Canned pie apples	67
Canned apple juice	85

---Editor

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TIME TO LIME

Acidity is like sickness - an ounce of prevention may be worth a pound of "cure".

Many folks prefer to remain healthy by following a reasonable diet. Then why not treat your soil and crops the same way?

By Keeping Them "Sweet".

Why not try a policy of liming sods before they run out?

1. The lime will be slowly penetrating and working.
2. It may help your crop and won't be lost.
It should keep "sweet" soils up and improve others.
3. Spreading can be done more easily when conditions are firm - summer, fall, or when the ground is frozen.
4. You can save time and labor through bulk spreading.
5. When time comes to plow and harrow, the lime will be better mixed through the soil.
6. If you should turn up acid bottom soil, then lime it some - it won't need as much.
7. Judge the lime rate and frequency by means of soil tests.
Treatments might run 3 to 5 year intervals.

By Keeping Them Acid.

Of course, if you wait until sods run out, or the soil is really acid, it may take a heavy liming job to start a new seeding off.

Too often it has been necessary to rush this operation in the spring, when getting stuck-in-the-mud is most certain!

---R. W. Donaldson

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WILL THE BEACH PLUM RESPOND TO AN APPLICATION OF FERTILIZER?

Why doesn't the beach plum die of starvation? It is so often found on sand dunes where any compounds other than salt from salt spray must be very scarce. Any nitrogen, which is so essential to the growth of plants, that reaches the sand would certainly be washed out by the first rain. Yet the beach plum is able to live under such conditions. How can it?

A plant which is living so near the verge of starvation ought to respond markedly to an application of fertilizer it would seem. An experiment was started in the spring of 1953 to see what beach plums would do if given rather heavy amounts of fertilizer. In one field, five-bush plots were fertilized with a 7-7-7 fertilizer at rates of 250, 500, 1000, and 2000 pounds per acre. The fertilizer on the 250-pound plot was applied in early April. On the other plots half was applied in early April and half about June 1. Each year a record was made of yield and the amount of terminal growth. Leaves were analysed for total nitrogen to determine if nitrogen from the fertilizer had been picked up and whether differences in amount applied would be reflected in the amount found in the leaves. The three-year averages are given in the following table:

Fertilizer applied Pounds per acre	Pounds of fruit per plot	Average terminal growth per bush in inches	Percent nitrogen in leaves
none	85	2.1	2.27
250	67	2.2	2.27
500	101	2.3	2.27
1000	86	3.2	2.37
2000	50	2.8	2.37

It is apparent that an application of as much as a ton of 7-7-7, which would supply 140 pounds of actual nitrogen per acre, had very little, if any, effect on the yield and growth of the bushes or the nitrogen content of their leaves. The bushes on the 2000-pound plot were smaller initially than those on the other plots which accounts for the poor yield on that plot.

The lack of response of the beach plums to such heavy applications of fertilizer was not anticipated. It is probably associated with water relations. The soil on which these beach plums are planted is sand underlaid with gravel and it dries out very rapidly. Although the total rainfall for the growing season, April through September, was not low for any of the three years, the distribution was poor. There were dry periods of considerable duration in each season. Lack of water appeared to be the limiting factor.

In another location some beach plums along a stone wall were fertilized with enough nitrogen carrying fertilizer to give 200 pounds of actual nitrogen per acre. During a two-year period the fertilized bushes averaged 17.8 inches of terminal growth, the unfertilized 7.6 inches. These bushes failed to bear because beach plums are self-sterile and cross pollination was not provided. The greater growth at this location probably resulted partly from no crop and partly from a better soil and more moisture. These bushes are near a planting of cultivated blueberries which indicates that moisture is available most of the time.

These experiments re-emphasize the fact that water can be a limiting factor even with a plant which is adapted to living in dry places. Where water is limiting, any attempt to increase growth and yield by other means than adding water has little chance of success. Deriving profits from planting beach plums in dry sandy locations appears to have some limitations.

---J. S. Bailey

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DO IT NOW!

Remember last spring when the homeowners were calling in about those rabbit-chewed backyard dwarf fruit trees, and the commercial growers wanted to know what to do about those hopping pests that were skinning the bark off their trees? It was too late then to do anything except cry about it, bridge-graft, or in-arch. But it is not too late now for this season.

Rabbits live on a diet composed of a large variety of plants. By treating the plants which we consider desirable with a material distasteful to the rabbit, we cause it to switch its attention to other plants. Only taste repellents have proven practical; area repellents are frequently ineffective.

Taste repellents can be divided into two general classes; (1) winter or dormant season; and (2) summer or growing season repellents. Two good dormant season repellents are z.i.p., (formerly made by the B. F. Goodrich Chemical Company, and now compounded by the Larvacide Products, Inc., 117 Liberty Street, New York 6, New York), and Ringwood Repellent (Ringwood Chemical Company, Ringwood, Illinois).

Explicit directions for their use are given on the label of each package. The z.i.p. seems to retain its effectiveness best if it is painted on with a brush. Simply dilute the z.i.p. with only enough water so that it will spread easily with a paint brush. The Ringwood product appears to be equally weather-resistant, whether painted or sprayed on the tree trunk.

In order to properly use these materials, one must be somewhat of a weather prophet. All bark to a height that rabbits might reach during a heavy snow period must be coated with a repellent.

Massachusetts fruit growers can obtain at least one of these repellents from the following sources:

Caldwell and Jones
1108 Main Street
Hartford, Connecticut

Eastern Chemical Company
289 Ashland Street
Holliston, Massachusetts

Essex County Cooperative Farming Association
Topsfield
Massachusetts

Frank's Market Garden
Allen Street
Springfield, Mass.

Frost Insecticide Company
24 Mill Street
Arlington, Massachusetts

---W. R. Jones

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AN EVALUATION OF MOUSE CONTROL METHODS

An evaluation of methods requires extensive and accurate observations including the knowledge of many biological factors. It is surprising to know that some orchardists erroneously evaluate the effectiveness of last season's control by the number of mice present now. It is known that each spring and summer mice move into orchards from surrounding areas and through their great reproductive capacity rapidly repopulate an orchard, thereby requiring annual control.

At the present time there are three methods proposed by different agencies. This article will attempt to give the advantages and disadvantages of each method. However, it must be remembered that tests currently are being conducted and the following opinions are not final.

AIRPLANE BAITING WITH ZINC PHOSPHIDE-TREATED CORN: This method consists of broadcasting 6-8 pounds of poisoned cracked corn per acre by flying down each tree row.

Advantages:

1. A large acreage can be treated rapidly.
2. Low cost of both material and application.

Disadvantages:

1. Does not control Pine Mice. Under certain conditions Meadow Mice have been controlled effectively, but these results have not been consistent. This is probably due to the grain (corn or oats) not penetrating through dense cover to reach active mouse runways.
2. Small orchard blocks are not suitable for airplane coverage.
3. Hazard to wildlife. Several orchardists have reported finding dead pheasants.

GROUND SPRAYING WITH ENDRIN: This method is the application of Endrin as a spray to the ground cover at the rate of 2 pounds actual Endrin per acre.

Advantages:

1. Gives effective control of Meadow and Pine Mice.
2. Reasonably fast--one sprayer can treat approximately 20 acres per day.
3. Ordinary spray equipment with minor changes can be used.

Disadvantages:

1. Costly. Of the three methods this is the most costly. The cost of Endrin will be \$10-15 per acre, application costs in addition.
2. This material does not have federal registration for use in mouse control which should preclude its use.

3. Hazards. This method is hazardous to humans, domestic animals, pets, wildlife, and fish. Several operators have been ill from exposure to this material during application. There is also a hazard to persons eating sprayed fruit from treated orchards. The full chronic effects are not known. This treatment has resulted in the death of dogs, a goat, quail, pheasants, rabbits, opossum, and various song birds.
4. Characteristics and effects of this new chemical are not fully known.

TRAIL BAITING WITH ZINC PHOSPHIDE APPLE AND OATS: This method involves the application of specially prepared baits to natural or artificial mouse runways.

Advantages:

1. Many years of extensive use have proven the effectiveness of this method for controlling both Meadow and Pine Mice.
2. The method has proven safe from the standpoint of the operator, domestic animals, and wildlife.
3. It is adaptable for various type of orchards--either hand-baiting or trail builders can be used.
4. By use of a trail builder, 20-25 acres per day can be treated.

Disadvantages:

1. In hand-baiting, conscientious personnel is required and the method is relatively slow.

---H. A. Merrill

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CASUALTY INSURANCE

What Is a Casualty?

The term "casualty" refers to an identifiable event of a sudden, unexpected or unusual nature; a mishap. In general, this means that a casualty loss must result from a sudden destructive force. Damage from a normal process or from progressive wearing out of property through a steadily operating cause--such as the steady weakening of a foundation from wind and weather not unusual in nature--is not a casualty loss. The fact that a flood, hurricane or other disaster is near is not a casualty. A casualty results only when actual physical damage occurs to property or there is a partial or complete loss of property. Fire, windstorm damage, flood, collision, accidental death of livestock, damage by lightening, and hail, are examples of casualty losses.

Farmers are likely to have much of their capital in values of buildings, livestock, equipment, crops, feed, and supplies, all subject to casualty losses.

Hence, a farmer needs to be concerned with the possible effect of a substantial casualty loss on his business, his family's welfare and his financial position and ability to continue farming. To provide funds to replace the property loss or to indemnify the farmer for the loss of use or value, insurance is offered by various companies and for some of the various risks or exposures involved.

Property Casualty Insurance

Insurance provides a way for an individual, the farm owner, to contribute to a fund that will be used to defray expenses that arise from losses due to damage to, or destruction of, his property by fire or other selected causes.

The insurance company's liability to the policy-holder is normally figured on the actual value at the time of loss of the property destroyed, but not exceeding in any case the coverage specified in the policy. An insurance policy is a contract. Under its terms, the company agrees to make certain payments or indemnity for losses that may occur, in return for the payment of a premium.

In most cases, the limit of the insurance company's liability under a policy has been interpreted to be the depreciated replacement value of the property damaged or destroyed. Small amounts of damage, which make up the majority of claims for many companies, are frequently settled by complete replacement or repair. The most common insurance coverage is that which insures property against damage resulting from fire. Many companies, offer additional endorsements to the original contract and may give extra coverage. Protection from such hazards as smoke damage, windstorm, hail, explosion, falling aircraft, etc., may be provided for by an "extended coverage" endorsement.

Cost of Insurance

Casualty insurance costs vary a good deal; the kind of property insured, its location, the amount of insurance carried, the risks insured, and the type of company involved, all have an effect on cost. The type of construction of the buildings and different kinds of livestock and machinery may have different rates. Special situations may have attached discounts or penalties. Protective devices such as lightning rods, approved fire extinguishers, hydrants and farm water supplies may affect rates. Spacing, use and size of buildings affect rates.

Checking Insurance

In spite of urgent suggestions to policy holders to "Read your Policy" experience show that few policy holders do so. There are some precautions that farmer policy-holders should take for their own protection. A partial list is given below:

1. Check the amount of coverage.

- A. If the policy covers a single item of property and is the only policy, amounts shown on the policy in different sections should agree.
- B. If the policy is one of several policies on the same property and policies are in different companies make sure the policies are in agreement, (i.e. "concurrent" in insurance language) and that the sum of the amounts of the policies equals the total coverage you want.

- C. If your insurance policy states that the rate is affected by a "co-insurance clause" (usually 80%) ask your agent to compare your coverage with the insurable value of the property.
2. Check the "risks" covered by the policy to be sure that the insurance policy insures the risks you want covered.
 3. If your policy calls for filing a "schedule" or inventory of property on hand to be insured, (used on some policies on poultry and other livestock) at stated intervals, be sure that this is done.
 4. Most policies state that "the company shall not be liable" for loss in excess of the amount of the policy and shall be liable for loss only in proportion to the total insurance carried that the policy bears to the total insurance coverage in force. Policies also generally state that coverage shall not exceed the "actual cash value" at the time of the loss. As stated above this is usually interpreted to be "depreciated replacement value."
 5. Be sure the policy as written describes the property insured correctly and also lists the owners (holders of title) and any mortgagees or lien holders.
 6. Be sure your policy is signed by a representative of the company.
 7. Don't hesitate to ask your agent to explain your policy to you. It is his job to be sure the policy you buy is the policy you want.
 8. Take an annual inventory of property and keep it in a safe place.

What Insurance to Carry

Whether you carry insurance against insurable risks depends on the answers you have to three questions. They are:

1. What is the risk I am taking or what are the chances of a loss?
2. What will it cost to insure against a loss?
3. How would a loss affect me, my family, and my farming business, if I had a loss?

While the words of the song go "There's no one with endurance like the man who sells insurance" it should be remembered that your insurance agent can be a real help to you in setting up your insurance protection program. It's good farm management to consider insurance when needed.

Not all insurance companies write insurance on all type of risks. Some risks are not insured by any company. Recent trends in insurance have been in the direction of broader coverage (covering more risks) and towards combining more coverage in the same policy, frequently with little increase in rates and in some cases at lower rates.

---L. D. Rhoades

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OBSERVATIONS ON THE BOSTON MARKET

An important feature of the course in fruit marketing given by the Pomology Department is a trip to the Boston Market. One day of this trip is devoted to giving the boys an opportunity to visit packing houses and storages enroute to Boston and the following day is spent in and around the Boston Market.

Here are some of the things the boys saw and heard at the Boston Market on such a trip taken recently.

They visited the Terminal Market and the Auction Market. At each of these they saw fruit and produce uniformly graded and attractively packed in neat new packages. Then they went to the Faneuil Hall Market. Here they had an opportunity to observe the contrast with what they had seen previously. What did they see at Faneuil Hall Market?

1. Stacks of dirty weather beaten crates jumble packed with mixed grades and various sizes in the same package.
2. Numerous closed packages which failed to carry the markings required by the Massachusetts Apple Grading Law.
3. One lot of apples labelled "Fancy" which obviously was a poor grade of drops with large soft bruises.
4. One box in which the following blemishes were observed in excessive amounts: San Jose scale, Curculio, leaf roller, bud moth and maggot.
5. Golden Delicious apples jumble packed in cartons which bulged in all dimensions.

These conditions mentioned above were observed in lots of apples shipped in from neighboring states as well as those from Massachusetts growers.

6. Several lots carefully graded and uniformly sized, packed in neat cell cartons. These lots had eye appeal and were moving readily at good prices.

Two commission men explained to the boys some of the problems involved in the sale of apples. Both stressed the point that well graded, neatly packed apples will always move at the top of the market, but that there is a limit to the price that housewives will pay for apples.

One man in particular who handles a large volume of fruit emphatically denied that the Boston Market is a "sick" market for he could get as much for good quality apples as could be obtained elsewhere. His complaint was that the best fruit is being sent to other markets and the less desirable grades are being shipped to Boston. Both predicted that unless growers start moving McIntosh in greater volume a short crop will become a large crop at the end of the season.

---O. C. Roberts

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

JANUARY 15, 1957

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RESEARCH ON ORCHARD DISEASES
at the
WALTHAM FIELD STATION

Orchard disease research has been a part of the overall activity of the Waltham Field Station almost from the beginning of its establishment as the Market Garden Field Station in Lexington in 1917. The work was done by members of the staff of the Botany Department of the University, originally by Webster S. Krout (1920-22), then William L. Doran (1923-27), and from 1928 by the writer. The work was related to disease control, spray injury, dust vs. spray and laboratory and service work.

Krout's work showed that Bordeaux mixture was as good as lime sulfur in the pre-blossom sprays. Lime sulfur was advised for the rest of the schedule (Mass. Sta. Bul. 214, 1923). Doran showed that there was nothing gained from copper sprays or dusts before bloom. Preference was given to lime sulfur and sulfur dusts. Omitting copper materials significantly lessened fruit russet. Lime sulfur and lead arsenate caused foliage injury, but a dry mix of sulfur, lime and casein (New Jersey Dry Mix) did not.

This was the beginning of the trend toward wettable, insoluble sulfurs. The fineness of sulfur particles was emphasized, and eventually perfection was reached with sulfurs with particles in a range of 1-3 microns in diameter. In this respect the paste sulfurs were unique. This was a vast improvement over 75-100 micron sulfur used in the first dry mix sulfurs in the period 1922-25 and coincidentally in better control of scab. Lime sulfur became less and less worthy and then in 1943 it was omitted altogether from our official schedule of applications.

With improvements in fine particle size came multiple X sprays, concentrates and mist blowers, air borne machines and improvements in dusting to improve distribution and coverage, and less dependence on water as a carrier.

The introduction and success of ferbam was sensational. The substitution of ferbam for sulfur eliminated fruit russet on Delicious. It improved foliage color and yields by supplying nitrogen directly through the leaves. It gave better control of apple rust than sulfur. The circumstances led to exhaustive search for more and better dithiocarbamate fungicides. Ferbam was followed by ziram, zineb, maneb, for vegetable disease control, replacing the traditional copper fungicides, and by thiram and the new iron and manganese carbamates.

The phenyl mercury fungicides were introduced in the early forties, and what an immense help they have been in serious scab situations. They replaced lime sulfur for eradicating scab. They gave back-action control of scab three to four days from the beginning of the rain-infection period. Scab control with back-action fungicides exploded the idea of protection in advance of infection rains as the one and only method of controlling scab. Coincidentally, in-the-rain spraying and dusting became a feature of the grower's practice.

In the progress with organic fungicides we have also seen the trend away from lead arsenate in the apple schedule and its elimination altogether from the peach schedule. These circumstances have given the fungicide schedules a greater measure of safety.

The strong trend to dichlone, captan and glyodin, and the promise demonstrated by thiram and the new iron and manganese carbamates characterize the present era of fungicides on orchard fruits. The most recent materials preserve the natural function of the foliage and the satin finish of the fruit. Glyodin is in addition an excellent spreader-sticker, thus being valuable in combination with other fungicides. All of the new materials except Phygon may be used with superior type oils at delayed dormant. We now have safe fungicides for all varieties and for inter-planted apples and peaches. Thiram does not injure peach foliage, nor is it injurious to Red Delicious foliage. Both of these circumstances have restricted the use of captan. Thiram, like ferbam, controls the apple rust diseases. These newer materials are compatible with phenyl mercury. The half and half mixtures in general show advantage by better all-purpose fungicidal action and greater safety to the foliage. Greater tolerance, better wetting, and better disease control feature the new fungicides.

The fruit disease work at Waltham has been publicized at growers' meetings in annual reports of the Massachusetts Fruit Growers' Assn. and Mass. Agr. Experiment Station, scientific meetings and otherwise. The tests and observations have been useful in contributing to improvements and revisions of the fruit spray schedules.

Apple growers are familiar with the professional character of the 1956 apple spray schedule. It comprises 14 pages of pertinent information to guide the grower to produce a clean crop of apples. The progress of change in a period of near 50 years can be appreciated from a glance at the apple spray schedule of 1913. In those days apples were packed in barrels and the spray schedules were prepared by clerks in the State House in Boston. The two important sprays came at dormant for scales and at calyx for codling moth and leaf feeding insects. Scab was of minor importance. The schedule was composed of six spray applications, but in many cases only two were necessary. The materials used were lime sulfur or miscible oil at dormant, and lime sulfur, Bordeaux and lead arsenate for the other spray applications. The array of pests today represents a vast change from the past and obviously makes an alert research and extension program a necessity. The present activity of the writer on fruit diseases involves two projects:

Investigation of Fungicides that Promise Value in Apple Disease Control.

Presently we have been comparing Thiram, the iron and manganese Fungicides, Glyodin, Captan, and US 605 (thiram and dichlone combined). The materials were combined with superior type oils at delayed dormant and with insecticides recognized in the official spray schedule.

Taxonomy, Infection Cycle and Fungicidal Control of Peach Canker caused by the fungus *Fusicoccum amygdali*. The late Dr. O. C. Boyd reported this disease in peach orchards of southeastern Massachusetts in 1940 and this was the first report of the disease in Massachusetts. When the disease came to my attention in 1954, it was epidemic and destructive, and a subject worthy of immediate study. We have investigated the organism causing peach canker, the infection cycle and infection sites. We have organized spray schedules to fit vulnerable periods in the life history of the pathogen. In the beginning of our work the disease was a big question mark, and our knowledge of its control was zero. By fundamental studies, life history and infection studies, and spraying tests, the various aspects

of the problem have been pieced together into a comprehensive understanding of the pathogen and its control. The growers in Bristol County, realizing the "life and death" character of the problem, have cooperated splendidly. Now the disease is well under control.

With the expansion of the orchard of Waltham, and recognition of our fruit disease programs, we will continue to serve the fruit industry in the study of disease problems peculiar to Massachusetts.

---E. F. Guba

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BLUEBERRY VARIETIES - FROM "BACK WHEN" TILL NOW

The blueberry breeding programs of several institutions have arrived at a point where a considerable number of new introductions may be expected in the near future. As new names appear on the variety list, the tendency is to forget those which have proved useful in the past. It might be well, therefore, to stop occasionally and take another look at these "old friends" as well as to examine the possibilities of the new.

Although some sporadic selecting had been done previously, the orderly approach to the development of named varieties of cultivated blueberries was started in 1909. The first varieties to be named and introduced were selections from the wild. Most of the selecting was done by Miss Elizabeth C. White of Whitesbog, N. J. and Dr. F. V. Coville of the U. S. Dept. of Agriculture. Among the selections, Sooy, Russell, Brooks, and Chatsworth never became of commercial importance. They were used for breeding only.

The six selections, Rubel, Sam, Dunfee, Adams, Harding, and Grover were used commercially for a while, but only Rubel continues to be grown.

Rubel has survived because of its productiveness and general hardiness. Rubel ripens late and has a very long picking season. The fruit is only medium in size, firm, medium blue, fairly attractive, and has a good scar and good flavor. The bush is upright, vigorous, very productive, and resistant to a wide variety of adverse conditions. Some growers have indicated that because of its productivity and reliability they would plant more if they did further planting.

The early hybridization was done by Dr. F. V. Coville of the U. S. Dept. of Agriculture. The first three of his selections, Pioneer, Cabot, and Katherine, were named and introduced in 1920.

Pioneer (Brooks X Sooy) was a very popular mid-season variety for many years and many can still be found in commercial plantings in Massachusetts. It has outstandingly fine flavor but the bush is only moderately vigorous and requires much detailed pruning which is costly. The berries decrease in size rather rapidly at the end of the season. It is no longer recommended in Massachusetts.

Cabot (Brooks X Chatsworth) is an early variety which had only earliness to recommend it. The fruit lacks flavor and cracks after rains. The bush is very subject to the stunt virus and gets crown gall in wet locations. It hasn't been recommended for many years.

Katherine (Brooks x Sooy) has such fine flavor that at one time it was referred to as the McIntosh of blueberries. The bush was vigorous and fairly productive. It's great fault was difficulty in picking. The skin tore so often and so badly as to spoil the looks of a basket and hurt keeping of the berries. It never became a commercial variety.

In 1926 two more of Dr. Coville's hybrids, Greenfield and Rancocas, were introduced. Greenfield (Brooks X Russell) was an early, low growing type with small, dark fruit. It never was planted commercially.

Rancocas [(Brooks X Russell) X Rubel] is an early variety which rates high with some New Jersey growers because of its productiveness. In Massachusetts the bushes are slow in coming into production, the berry clusters are tight, making the first picking or two difficult. The first berries are large if the bushes are well pruned but size decreases rapidly as the season progresses. It is not recommended for Massachusetts.

Jersey and Concord were introduced in 1928. Jersey (Rubel X Grover) is still one of our good commercial varieties. The bush is upright, vigorous, productive, and hardy. The fruit ripens late, with Rubel, is medium to large in size, firm, attractive, a good blue, and has a good scar and good flavor, if the berries are left on the bush till thoroughly ripe. The fruit stems are long which makes the clusters open and the berries easy to pick.

Concord (Brooks X Rubel) is a midseason variety which performed well in some parts of Massachusetts but not in others. Because of its variable performance and the availability of better varieties, it is no longer recommended.

Two years later, in 1930, Stanley and June were introduced. Stanley (Katherine X Rubel) is a very fine flavored, second early variety. It attained some popularity in New Jersey but was never planted extensively by Massachusetts growers. The bush is upright and vigorous but has too open and straggly a type of growth. Under Massachusetts conditions it has not produced very well except in the hands of a very few growers. It is being replaced by more productive varieties.

June [(Brooks X Russell) X Rubel] is a very early variety. The bush is very slow to come into bearing and lacks vigor. It never attained commercial status in Massachusetts.

Scammell [(Brooks X Chatsworth) X Rubel] was introduced in 1931. It proved to be too sensitive to winter cold to be of any value in Massachusetts.

The three varieties, Wareham, Weymouth, and Dixi were named and introduced in 1936. Wareham (Rubel X Harding) was popular in Massachusetts for a time because of the vigor and productiveness of the bush and the lateness and high flavor of the berries. It has two serious faults. The fruit is dark colored and is cracked badly after rains. For these reasons it is no longer recommended.

Weymouth (June X Cabot) is a very early variety. The bush is small and weak and not very productive. It has never been recommended for Massachusetts.

Dixi [(Jersey X Pioneer) X Stanley] made a real sensation when it was introduced. It had produced berries nearly an inch in diameter, the largest berries up to that time. The bush is upright, moderately vigorous, and moderately productive under Massachusetts conditions. The fruit ripens late, is very large and firm, has fair flavor, a fair scar and is a fair blue in color. Because of its size, it was recommended for home gardens for those who wished large berries. It is no longer recommended since varieties such as Berkeley and Herbert are just as large and are better varieties. The naming of this variety is interesting. It was the last variety named and introduced by Dr. Coville before his retirement. He used the Latin word Dixi because, as he explained, it was used by Roman orators at the end of a speech. It means, I have spoken.

Three more varieties were introduced in 1939, Atlantic, Pemberton, and Burlington. Atlantic (Jersey X Pioneer) has not been popular with most Massachusetts growers. The bush is slow to come into bearing. Only a few growers like it. The fruit ripens late, is medium to large in size, has good flavor and color, a very good scar, and is very good for freezing. It is not recommended.

Burlington (Rubel X Pioneer) is very late and very cold resistant. The fruit has an unusually small, dry scar. However, the bush is small and only fairly productive and the berries are small. It is not recommended for Massachusetts.

Pemberton (Katherine X Rubel) is one of our commercial varieties. The bush is upright, vigorous, and productive. It has been quite winter hardy. The fruit ripens late, although not quite so late as Rubel. It is large, firm and attractive. It has excellent flavor, good blue color, but a poor scar.

It was ten years before the next two varieties were introduced in 1949. These were Berkeley and Coville, two of the so-called Big Six. Their performance over several years has been very satisfactory. They are recommended for commercial and home planting.

Berkeley, (Stanley X (Jersey X Pioneer)) ripens in midseason. The bush is upright, vigorous, productive, and easy to propagate. The berries are extremely large, light blue in color, firm, mild flavored, and have a large, dry scar.

Coville [(Jersey X Pioneer) X Stanley], another of the Big Six, is a very late variety, ripening after Rubel. It has very high flavor but is a bit tart unless thoroughly ripe. The bush is upright, spreading, vigorous, and very productive. The berries are large, firm, and attractive with good blue color and a good scar.

Two varieties bred especially for North Carolina conditions, that is, for very early ripening and resistance to canker disease, were introduced in 1950. Wolcott and Murphy are both crosses of [Weymouth X (Stanley X Crabbe 4)]. Both were said to be "not promising in Maryland and New Jersey". It seemed that farther north they would have little chance for success and have not been suggested for trial.

Angola and Ivanhoe, introduced in 1951, are two more varieties bred for canker resistance for North Carolina. Angola [(Weymouth X (Stanley X Crabbe 4))], like Wolcott and Murphy, was considered unlikely to succeed in the north.

Ivanhoe [(Rancocas X Carter) X Stanley], on the other hand, seemed to have promise enough so that it was considered for a time as a member of the Big Six. It ripens in Rancocas season. The fruit is large but a bit dark in color. The bush lacks vigor and productiveness under our conditions. It is not recommended.

Three more members of the Big Six were introduced in 1952. These all look promising, but until more is known about their performance under Massachusetts conditions they are recommended for trial only.

Earliblue (Stanley X Weymouth) is early as its name suggests. It ripens in Weymouth season or a day or two earlier. The fruit is light blue, very firm, large, and has good flavor. The clusters of berries are medium size and medium loose. The bush is upright, vigorous, and well shaped. It is said to be productive and easy to propagate.

Bluecrop [(Jersey X Pioneer) X (Stanley X June)] ripens in midseason between Stanley and Berkeley. The fruit is very light blue, very large, and firm, and fine flavored with an unusually good scar. The fruit clusters are large and medium loose. The bush is upright, fairly vigorous, and said to be very productive and moderately difficult to propagate.

Herbert [(Stanley X (Jersey X Pioneer))] ripens late, with Rubel and Jersey, a few days ahead of Coville. The fruit is very large and firm, about the same blue as Rubel and Jersey, and has an unusually good scar. The flavor is very good but may be a bit tart for New England taste unless the berries are very ripe. The bush is medium high, spreading, vigorous and productive. It is said to be easy to propagate.

The latest variety to be introduced is Blueray [(Jersey X Pioneer) X (Stanley X June)]. This is the same parentage as Bluecrop. It is a second early ripening between Earliblue and Bluecrop, in Rancocas-Stanley season. It is expected to replace Ivanhoe as one of the Big Six. The fruit clusters are rather small, tight and attractive. The berries are very large, about the size of Berkeley, firm, light blue, very aromatic and high flavored, but may be a little tart if not fully ripe. The plants are erect, somewhat spreading and said to be very vigorous and productive. It looks promising and is recommended for trial.

---J. S. Bailey

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JUST IN CASE YOU HAVE FORGOTTEN

Hey, Mite -- Who Are You?

	European	Clover	Garman Spider	
	Red	Mite	Mite (Yellow Mite)	Two-spotted Mite
Winter stage	eggs - dull red	eggs - shiny red	adults - yellow	adults - dull orange or pink
Where found	spurs, twigs, branches	trunk, stones, vegetation	under loose bark	Under debris on ground (loose bark)
in winter				
Hatching period or become active	Pink thru Bloom	Silver-tip thru Delayed Dormant	Late Delayed Dormant to early Pink	on ground cover-Silver-tip to Green-tip
				About early Delayed
First eggs laid by overwintering adults			About Pink	Dormant on grass and weeds
First adults mature and lay eggs	About Petal-Fall or soon after	Soon after Bloom		
Where summer eggs are laid	upper and lower leaf surfaces all over trees	On bark of spurs, twigs, branches and trunks	undersides of leaves	Undersides of leaves grass and weeds first later in trees
Egg color	dull red	shiny red	pearly white	pearly white to slight amber.
Number of generations	7 - 8	5 - 6(?)	4 - 6(?)	9 - 11
Identifying features of adults (summer)	brick-red, back rounded, light-colored spots and hairs, legs of equal length	brownish-red back flattened, front legs much longer than others	pale yellow or lemon yellow, dark spots scattered, body elongate oval	pale yellow or greenish yellow, two large dark spots, body oval
Activity of adults and young	move about, on both surfaces of leaves	return to bark to shed skins and lay eggs	among hairs on undersides of leaves	among hairs on undersides of leaves, webbing
Characteristic damage to leaves	general over-all dulling of green color and finally a bronzed effect	a quick yellowing, usually on 1 or 2 branches at first (look for white, empty skins on spurs)	spur leaves crinkled, mottled yellow and brown; later leaves cupped from below, yellowed above along veins, greyish below	similar to Yellow mite, appears later, general yellowing follows, seen first on inside and low-hanging branches, in July or later

Why not tack this up for ready reference? Hey, its a good idea!

---E. H. Wheeler

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NEWER FRUIT VARIETIES

Some Good - Some Not So Good

The following reports on behavior of some of the newer fruit varieties under test in the University of Massachusetts plantings are brought together in this issue at the suggestion of the New Varieties Committee of the Massachusetts Fruit Growers' Association with whom we are cooperating in the state wide testing of new varieties.

These notes should be considered as supplementary information on varieties recommended for planting in Massachusetts as given in Extension Service Special Circular #212-A, B, C, D, E, F, G and H which are available from your County Agent or the Mailing Room, University of Massachusetts, Amherst.

RED RASPBERRY

Tweed - A very early variety introduced from Ottawa, Canada. Parentage: Newman 23 x Lloyd George. Fruit small, quite inferior quality. Value for Massachusetts practically none.

Antietam - An early variety from the University of Maryland. Fruit medium size, rather firm but poor quality. Of no value here.

Early Red - Originated at South Haven, Michigan as a cross between Lloyd George and Cuthbert. In season it ripens with Chief but has larger and somewhat better flavored fruit which is bright red. The canes are only moderately winter hardy and are moderately susceptible to spur blight. Worthy of limited trial where a berry of this season is desired.

Willamette - A midseason variety from Oregon. Parentage: Newburgh x Lloyd George. Fruit quite large, firm, medium red, and fine flavor. Unfortunately, this variety has winter killed as much or worse than Marcy which would make it very much of a gamble in most parts of the state.

Muskoka - This midseason variety originated at Ottawa, Canada as a cross between Newman 23 and Herbert. The fruit is medium size, light red, moderately firm and fairly good quality. Reported as extremely winter hardy in Canada but winter killed 50% here last winter.

Puyallup - Originated at Puyallup, Washington as a cross between Washington and Taylor. In season it appears to be about with Latham. Its fruit is rather large, firm, medium red, conic shape, with a distinctive flavor and very good quality. Last spring it showed somewhat more winter injury than Milton which is a bit too much for comfort.

Other new reds under test include Canby, Crimson Cone and New Hampshire. However, these plantings are still too young for even a preliminary evaluation of their fruit and plant characteristics.

Lack of sufficient winter hardiness of the canes continues to be the greatest weakness of most of the newer red raspberry introductions.

---A. P. French

STRAWBERRY

Many new varieties were included in the variety trials this past season, a report on a few follows:

Surecrop (Md - U.S.D.A. No. 2233) - This recently named variety is resistant to two strains of red stele. The plants were vigorous and productive. The fruits were medium in size, attractive and of good quality. This early ripening variety shows promise of value to growers having trouble with red stele.

Earlidawn (U.S.D.A. No. 3939) - a newly named U.S.D.A. introduction. This was the earliest ripening variety in the University planting this past season. The fruits were of medium size and of fair to good quality. The plants are very susceptible to the common strain of red stele and were nearly a complete failure in our trials. Earlidawn may be of value to growers who are not bothered by red stele.

Redglow (U.S.D.A. No. 4194) - Another newly named introduction. This early - midseason variety was vigorous, moderately productive and appeared to be resistant to the common strain of red stele. The fruits were small, distinctly necked, and of fair to good quality. This variety needs further testing before a more complete evaluation of its usefulness can be made.

Crimson Flash - A seedling of Fairpeake. Limited trials indicate that this early midseason variety will produce vigorous and productive plants. The berries were small, roundish, dark red and of good quality. Further testing is required before a fair evaluation can be made of this variety. Not resistant to red stele.

Strafford - An introduction of the New Hampshire Station. This is a late ripening variety with plants of moderate vigor and size but with good production. The berries were large, attractive and of good quality. Strafford was badly damaged by red stele and should not be planted where this disease is present.

Phelps - This New Hampshire introduction produced attractive berries of medium size and good quality. The plants were vigorous, of moderate number and fair production but were very susceptible to red stele. Phelps does not appear to be promising from results of this years trials.

Blaze - A New Hampshire introduction for the late season. The berries were large, attractive, bright red, soft in texture and only fair quality this past season. The plants were of good vigor and high production. Blaze is not resistant to red stele, but is worthy of trial where this disorder is not present.

Lassen, Shasta and Donner. - These three introductions from California were tested in the University plantings this year with Lassen having a decided edge over the other two. These varieties produced fruit of good quality but the plants lacked vigor, were low in yield and very susceptible to red stele. These varieties do not appear to be adapted to Massachusetts.

---J. F. Anderson

APPLE

Red Melba - A red sport of Melba which is superior in color. Good quality for an early apple. Season early August. Recommended for commercial planting where an early variety is desired.

Beacon - A rather attractive, well colored early apple from Minnesota. Season mid - to late August. Fruit quality generally good for an early apple but may be quite variable from season to season. Fruit size is usually good but this year fruit size was definitely too small. The tree is productive. Because of its erratic performance Beacon does not look too promising as a commercial variety.

Puritan - A promising early red apple. Fruit attractive, good quality for its season, somewhat tart. The tree is hardy and vigorous but has a tendency toward biennial bearing. Puritan will pollinate McIntosh. It is worthy of extensive trial.

Jubilee - Originated from a cross of McIntosh x Grimes Golden at Summerland, British Columbia. The fruit is well colored and attractive with a rather light colored red. Fruit quality is good but size runs too small. It will require thinning to maintain satisfactory size. Jubilee has a longer storage life than McIntosh. Harvest season is late September. Jubilee will pollinate McIntosh. Jubilee may be given limited trial, but it appears inferior to Spartan.

Spartan - A McIntosh x Newton seedling from British Columbia. It is an attractive dark red apple with McIntosh shape and quality. Spartan retains quality in storage much better and longer than McIntosh. The fruit may have a tendency to be small. The tree is a vigorous McIntosh type. Harvest season is late September. It will pollinate McIntosh. Spartan shows great promise as a variety to extend the McIntosh season and should be given serious consideration for future plantings.

Idared - A promising Wagener x Jonathan cross from Idaho. The fruit has an attractive bright red finish. Fruit quality good but somewhat on the mild side. It has a long storage season. Harvest season is early October. Idared is one of the more promising late keeping dessert and general purpose apples.

Melrose - A high quality winter apple introduced by the Ohio Experiment Station. Melrose is a Jonathan x Delicious cross. The fruit is well colored, has good size and shape. It may develop some russetting unless given a mild spray program. The fruit has excellent dessert and cooking qualities and a long storage season. The tree is productive, has good structure, and is annual. Harvest season mid-October. Melrose is cross incompatible with Delicious but will pollenize other varieties. Melrose shows much promise as a replacement for Baldwin. It should be given extensive trial.

Bancroft - Introduced from Ottawa as a late winter apple. It fruited for the first time this year. The fruit has good size and shape and is well colored. The full dark red color along with considerable scarf skin detracts from its appearance. Quality is only fair. It should keep well in storage. Harvest season mid-October. We have not seen enough of Bancroft to fully evaluate it at this time.

Sandow - A Spy seedling introduced from Ottawa. The fruit is of good size, well colored and fairly attractive. Quality good for a late winter apple. Fruit is reported to be subject to bitter pit. We have not fruited Sandow long enough to determine its value.

Crandall - A Jonathan x Rome introduction from Illinois. Fruit good size and shape, fairly well colored with an attractive bright red. Fruit flesh is fine grained and juicy but quality only fair. Crandall is a hard apple which should keep well in storage. It needs further testing.

Monroe - A Jonathan x Rome introduction by the New York Agricultural Experiment Station. An attractive, well colored medium red apple of good size. Fruit quality good but not up to dessert quality. Monroe shows promise as a winter apple but needs a few more seasons observations before we can determine its value for Massachusetts.

---W. D. Weeks

PEACH

Sunrise - An early, attractive, medium size yellow peach which ripens a few days ahead of Early East. Fruit quality varies with season, but fairly good for an early peach. A clingstone unless fully ripe. Suggested for limited trial where an early peach is desired.

Early East - A rather attractive good sized yellow peach. Fair quality, semi-cling, somewhat irregular in shape. Early East ripens about 10 days ahead of Golden Jubilee. Suggested for limited trial.

Prairie Dawn - An attractive yellow fleshed freestone peach which ripens just after Jerseyland. Fruit juicy and good quality. Bud hardness above average. Worthy of trial.

Prairie Daybreak - A yellow flesh freestone which ripens with Jerseyland. Fruit quality not too high. The flesh is greenish yellow and the buds are no hardier than Elberta. Prairie Daybreak is inferior to Jerseyland and of doubtful value for Massachusetts.

Hale Harrison Brilliant - A large yellow fleshed freestone which ripens 3 to 4 days before Elberta. It is better quality than Elberta and is worthy of trial.

Sungold - A yellow fleshed freestone of Elberta season. Quality varies with season. Tree is not vigorous, on the small size. Sungold has been around for several years but it has not been outstanding enough to recommend it and is of no particular value.

---W. D. Weeks

PEAR

Cayuga - Attractive, juicy, fair to good quality, medium size, skin rather thick and tough. Tree large, vigorous, late coming into bearing.

Covert - Ripens late September, fruit large, green color, resembles Bartlett in shape, fair quality excellent keeper. Tree medium in size, productive.

Douglas - Fruit small, poor quality, unattractive. Resembles Kieffer in shape and quality. An undesirable variety for the fresh fruit market.

Ewart - Ripens mid-September, fruit large, yellowish-green, attractive, good to excellent quality, keeps a month later than Bartlett. Tree medium size, productive.

Gorham - Ripens two weeks later than Bartlett and keeps a month longer, a seedling of Bartlett which it resembles in size, color and shape; quality good to excellent. Tree medium size, not always a reliable cropper.

Ovid - Late, yellowish green, not particularly attractive, tends to russet, good quality, tough skin, excellent keeper. Tree large, vigorous, productive.

Phelps - Late, yellowish green, rough surface, medium size, good quality but somewhat tart, excellent keeper. Tree medium size, moderately vigorous, productive.

Waite - Late, greenish-yellow, medium size, fair quality, good keeper, lacks attractiveness. Tree medium in size and vigor, productive, blight resistant.

Willard - Late, large, rough surface, green with reddish blush, poor quality, difficult to ripen. Tree large, vigorous, productive.

---O. C. Roberts

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PRUNING ERRORS

The pruning season has arrived and with the anticipation of a snowball bloom in many orchards this is the logical year for growers to do heavy pruning where the need exists. The objective of the apple grower is to obtain a high percentage of fruits of the size, color and quality demanded by the market. The grower cannot afford to grow small, poorly colored fruits. Therefore, pruning to eliminate weak wood and thereby a lot of potential culls is in order.

Several rather common pruning errors have been found in orchards most of which occurred while lowering the tops of tall apple trees. Some growers are attempting to lower tree height by the removal of all branches above a certain level. This will not accomplish the desired results! Instead, a large number of water sprouts will develop near the pruning cuts and many of these will grow to a height greater than the tree before lowering was attempted. To reduce tree height growers should remove entirely tall branches or cut back to well placed strong lateral branches, depending on the tree under consideration.

home garden
In some cases growers are attempting to lower the tree height in one year and *do not* are not leaving enough branches or water sprouts to shade exposed limbs. Such a procedure results in considerable sunscald. If a tree has a number of tall branches, all of these should not be removed in one year. Remove over a 2 or 3 year period.

One of the objectives of lowering tall trees is to replace old wood on the remaining limbs with young, vigorous fruiting wood. Some growers have left too many water sprouts which are poorly placed. These water sprouts are in a key *home garden* position to receive the water and nutrients that otherwise would go to the parent scaffold branch. If too many of these water sprouts are left they may dwarf the parent branch beyond their point of origin. *leave* Growers should remove all but the most desirably located water sprouts. *side branches* It is the hope of the grower that as the water sprouts develop side branches they will settle toward the outside of the tree. Sometimes the water sprouts can be trained toward the outside of the tree by removing some of the inside branches or by heading back to an outward growing lateral branch.

Another error made in pruning bearing apple trees, especially with power pruners, is the removal of nearly all the smaller lateral branches from the scaffold limbs in the central part of the tree. The process begins near the trunk and often continues nearly to the ends of the scaffold limbs. The fruiting area then consists merely of a fringe at the ends of these "muletailed" branches. This makes any attempt to lower the tree height difficult because of possibility of sunscald and lack of desirable wood to cut back to. In addition, when pruning bearing trees the drooping ends of branches should be headed back to upward and outward growing branches. If nearly all the smaller branches on the main limbs have been removed, there may be no good upward and outward growing branches left to take over.

---W. J. Lord

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

FEBRUARY 15, 1957

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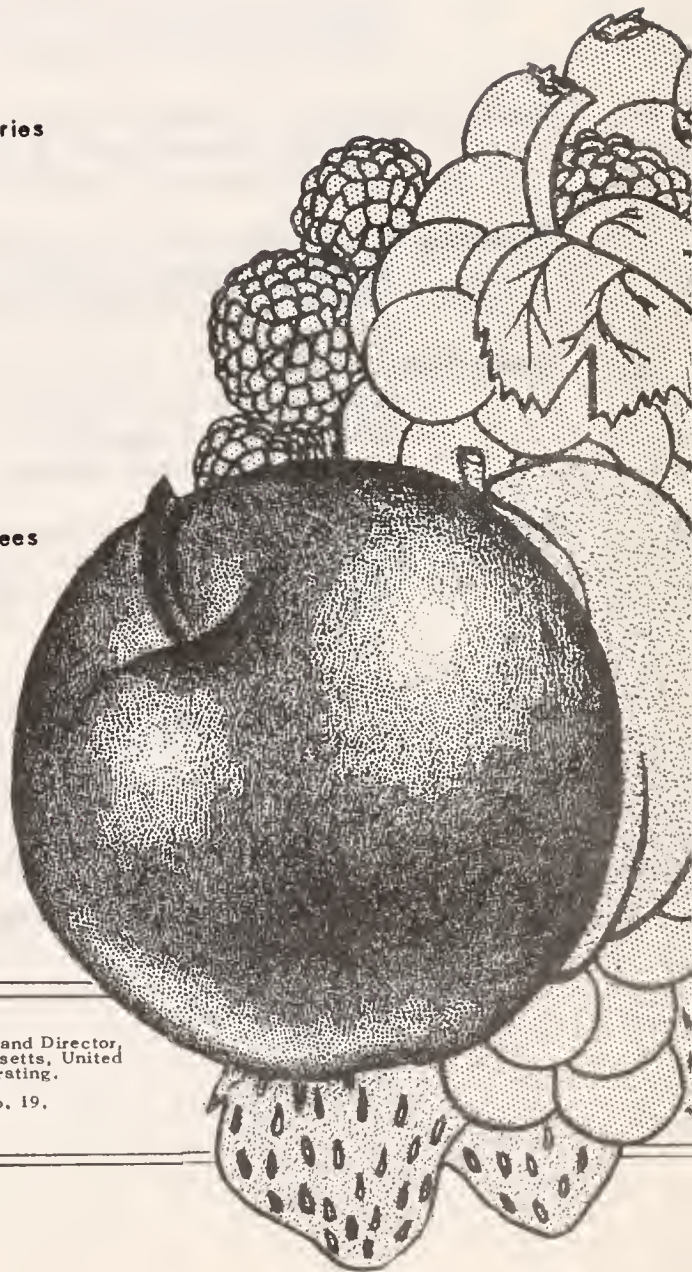
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FERTILIZER APPLICATIONS FOR CULTIVATED BLUEBERRIES

What kind of fertilizer shall I use for cultivated blueberries and how much? The table below attempts to answer these questions.

Years after plants are set	Annual Application of Fertilizer						For 10 bushes (pounds) 5-8-7	
	Pounds per acre							
	10-10-10	Combination		Sul. Am.	Sul. Am.	7-7-7		5-8-7
		10-10-10	Sul. Am.					
0	100	100	-	-	145	200	1-3/4	
1	200	200	-	-	270	400	3-1/2	
2	300	200	50	-	430	600	5-1/4	
3	400	200	100	200	570	800	7	
4	550	250	150	275	610	1100	10	
5	700	350	175	350	1000	1400	12-3/4	

Other fertilizer mixtures may be as good as those listed. The amounts suggested are to serve only as guides. The amount used should be based on the size, vigor and productiveness of the bushes. Where fields are in heavy sod or have been recently mulched with shavings, sawdust or other woody material, it is usually desirable to increase the nitrogen 50-100 percent.

In column 1, 0 indicates the year the plants are set. At this time soluble nitrogen carelessly used can injure the plant. Wait until the plants are established, about June 1, to apply the fertilizer. Spread it out well around the plants on a clear, dry day.

10-10-10 (column 2) is rapidly becoming a standard formula. The quantities recommended should be increased or decreased as experience indicates. It may be desirable the second or third year to split the application - half before bloom and half about June 1.

In columns 3 and 4 is given a combination of 10-10-10 to be applied in April and sulfate of ammonia to be applied June 1. Sulfate of ammonia, containing 20 percent nitrogen, is too strong for very young plants and replaces only 1/3 of the nitrogen 2 years after planting. Thereafter it can replace more.

The sulfate of ammonia only program in column 5 is for older bushes and for those which have been receiving liberal amounts of complete fertilizer. Since blueberries probably need all the elements, it is advisable to use an application of complete fertilizer every third or fourth year.

Column 6 gives the amount of 7-7-7 fertilizer which would be required to give the same amount of nitrogen as the 10-10-10 mixture.

Column 7 gives the amount of 5-8-7, 5-10-5, 5-10-10, or any other fertilizer containing 5 percent nitrogen, required to give the same amount of nitrogen as the 10-10-10 mixture.

The last column reduces the quantities in column 7 to amounts suitable for 10 bushes.

---J. S. Bailey

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APPLE OUTLOOK

The outstanding point in the apple outlook is that about the same quantity of apples will be divided among more and more people as the years roll on.

Apple time can be measured by tree age. There are 48 million more people in the country now than when a tree just 26 years old was planted, and another 38 million people are expected by the time that tree is 45 years old. Three or four twenty-acre orchards could be planted each week just to keep up with the population growth. That is a population increase - potential market increase - of 166% in the life of an apple tree. This means that the potential market for apples is greater now than at any time since the McIntosh variety was first grown commercially.

The volume of deciduous fruit produced for fresh use has held about steady since World War II and therefore per capita consumption has continued to decline.

New England apple production has held about the same in recent years (since 1939) in contrast to moderate or sharp declines in all other important producing areas in the East.

Much of the decreased acreage is due to the removal or abandonment of small, low-yielding orchards and those with less desirable varieties.

Not only has there been more people to eat apples in recent years, but consumers have had larger incomes and consumer income is expected to set another record in 1957.

Costs of factory made supplies will continue on present or slightly higher levels. The cost of hired labor will follow trends established in recent years in competition with local manufacturing and service industries.

The trend in consumer packages will continue onward. Technical problems of apple packaging will be solved if apples are to hold their relative position on produce counters of growing super markets.

The quantity of apples from controlled atmosphere storage is expected to increase in the next few years. Anticipated quantities pose a special problem of marketing with the controlled atmosphere storage apples very likely to appear on the market earlier in the season. Adjustments in selling the ordinary cold storage portion of the crop will have to be made to secure maximum returns for the whole crop.

The long term outlook for orcharding continues to be favorable for efficient operations in connection with well located orchards.

1957 will be the "on" year for apple yields in New England which should cause no concern in a year of record consumer income for those orchardists with a planned sales program.

---F. E. Cole

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VIRUS - FREE STRAWBERRY PLANTS FOR 1957

A recent release from the U. S. Department of Agriculture at Beltsville, Maryland, gives the latest information on the status of "virus-free" strawberry plants and the following is taken from that release:

At present there are 36 strawberry varieties essentially virus-free from which plants are available from nurseries for planting by growers. Of these, the following may be of interest to Massachusetts growers:

Armora	Fairfax	Redstar
Aroma	Gem (Superfection)	Robinson
Blakemore	Howard 17 (U.S.D.A.)	Sparkle (Paymaster)
Catskill	Midland	Vermilion
Empire	Pocahontas	

---W. J. Lord

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TREE CROWDING

This will be a good year to do something about the filler trees in crowded blocks. Tree crowding causes many production problems. It leads to tall trees which are difficult to spray and prune, a higher proportion of poorly colored fruit particularly on lower limbs, unproductive lower limbs, difficulty in mowing, and other orchard cultural practices and the interference with the development of the permanent trees. The writer feels that insufficient planting distances and the failure of timely removal of filler trees leads to more production difficulties than any other single poorly conducted cultural practice. Tree crowding in peach orchards is as prevalent as that in apple orchards. How many peach orchards in Massachusetts can't be properly sprayed or dusted for Brown Rot control because of insufficient room to drive between the trees?

How can tree crowding be avoided? Naturally, the answer is simply to use sufficient planting distances and the timely removal of filler trees.

Tree Spacing

Proper planting distance for trees will vary with the variety, soil fertility and water holding capacity. Generally, however, the following planting distances are recommended:

Apples - vigorous varieties	45' to 50'
less vigorous varieties	35' to 40'
Pears -	20' to 25'
Peaches -	22' to 25'
	25' to 30' on most favorable locations.

Filler Trees

Formerly filler trees in apple orchards were planted in the row and between the rows of permanent trees. For example, the trees on many farms were planted on a 20' by 20' basis with a plan to remove every other diagonal row when the trees began to crowd. The so called "semi-permanent" apple trees which were left were removed later when the trees again began to crowd. It is now recommended that the filler trees should be planted in the center of the square or rectangle or between the permanent trees in the row but not both. In this system there is but one filler tree to each permanent tree as compared to the old system in which 3/4 of the trees were fillers.

With the prospects of a snow-ball bloom in many orchards next spring this should be the year for growers to get up their courage and do something about the filler trees that have begun to crowd the permanent trees or to interfere with orchard operations. If crowding isn't too severe, the filler trees may be "fan-pruned" which merely means that they are pruned heavily on the sides adjacent to the permanent trees. On the other hand, the grower might do one of the following; remove all filler trees in the crowded block or remove the most objectionable filler trees from the standpoint of crowding and fan-prune the rest in anticipation of removing the remaining filler trees in the near future.

---W. J. Lord

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MODERNIZING YOUR BLUEBERRY PLANTING

The question has been asked, "Shall I pull out the older blueberry varieties and plant new ones?" This question of variety is as old as fruit growing. It has had to be faced by practically every fruit grower, no matter what kind of fruit he grows. Few blueberry growers in Massachusetts have had to face it yet. The asking of the question indicates an awareness that the problem must be faced sooner or later. What then should be considered in making such an important decision?

First, the grower is a business man who must make a profit to survive like every other business man.

Second, the means at hand must be such that a profit is possible for the conditions under which the grower is operating.

Third, if no profit is obtained, a change is necessary. If no profit is possible, a basic change is mandatory.

Now let's examine the blueberry replant problem. We'll assume that grower Smith has a field of an older variety--say Rubel. Should he pull out the Rubel and plant one of the newer varieties? First, let's ask that basic question. Is the field yielding a satisfactory return? If it is, why disturb it? If it isn't why not? Can anything be done to make it profitable without going to all the expense in time and money of replanting it? Will a change in soil management, pruning, fertilization, spraying or any other practice result in a sufficient increase in return to make the field profitable? If not, then replanting or elimination must be considered.

Before ordering the new plants, let's take a look at the site and make sure nothing is basically wrong. Is it too wet? Can this be corrected by drainage? Is it too dry? Can this be overcome by irrigation? Is it subject to cold injury either in winter or spring? Is a better site available? If the decision is to replant, then the \$64 question is what variety or varieties to plant.

It is not the purpose to discuss varieties here since this has already been done in a previous issue of Fruit Notes. However, a few general comments may not be amiss. Few growers would consider replanting such old varieties as Cabot, Concord, or Pioneer. On the other hand, there are some commercial growers who have stated that they would replant Rubel because of its dependability. When a new variety proves that it can yield more "greenbacks" per acre than Rubel, or any other variety, then is the time for replacement. Replacing a tried and proven variety because of its age by one that is new and untried is questionable. Among the new varieties Berkeley and Coville have performed well in Massachusetts over a long enough period so that they are being recommended for commercial planting. They will not quite replace Rubel because they are not the same season. On the other hand, Earliblue, Blueray, Bluecrop, and Herbert, while they look promising, have not had an opportunity to really prove themselves under Massachusetts conditions. They are recommended for trial only until they do.

Where new land is planted to blueberries, there is no past to serve as a guide. The site factors must have more careful consideration. The variety selection problem is similar except that a grower who has a considerable area in profitable production may feel that he can afford to gamble more heavily on the new and unproved varieties.

The testing of new varieties is very important and should have a place in a planting plan wherever possible. In the last analysis, it is the growers' judgement that determines whether a variety has a short or long life. Good judgement is based on personal experience with a variety.

Finally, let common sense determine when to replant your blueberries, not fancy descriptions in a catalogue.

---J. S. Bailey

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1957 FERTILIZER RECOMMENDATIONS

Most McIntosh orchards appear to have an abundance of fruit buds which with favorable weather could produce an excessive crop in 1957. Our fertilizer program should be directed toward the production of a medium sized crop of high quality fruit. To help accomplish this goal we believe that nitrogen applications should be reduced by one third to one half. It is particularly important to reduce nitrogen applications in those blocks which have been heavily pruned or had a light crop last year. In some cases it may be desirable to delay applying the nitrogen application until after petal fall. Trees which had only a partial crop last year should have a considerable reserve of nitrogen available for utilization this spring.

The potassium requirements of apple trees in a heavy crop year are high as the fruit utilizes about three times as much potassium as nitrogen. The quantity of potassium stored by the tree which is available for utilization is extremely low in comparison with nitrogen. Thus it is important to supply adequate potassium in a heavy crop year.

The following tables give suggested rates of fertilizer to use which will supply the nitrogen and potassium requirements of the tree in a normal crop year. The rates for nitrogen are for maximum amounts and should be reduced $\frac{1}{3}$ to $\frac{1}{2}$ as suggested previously. The first table presents two plans in which ammonium nitrate is used in combination with muriate of potash or 0-15-30. The second table shows the amounts to apply of two different mixed fertilizers which will supply equivalent amounts of nutrient elements.

Normal Rates of Fertilizer for Bearing Apple Orchards

Potential bushel yield of tree	Approximate amounts per tree				
	Nitrogen required	Ammonium Nitrate	Potash required	Muriate of Potash	or 0-15-30
	Pounds	Pounds	Pounds	Pounds	Pounds
Less than 15	0.66	2.0	1.3	2.1	4.3
15-25	0.66-1.00	2.0-3.0	1.3-2.0	2.1-3.3	3.4-6.6
More than 25	1.33-2.00	4.0-6.0	2.7-4.3	4.5-7.1	9.0-14.3

Normal Rates of Fertilizer for Bearing Apple Orchards

Potential bushel yield of tree	Approximate amounts per tree			
	Nitrogen required	Potash required	5-10-10	or 8-16-16
	Pounds	Pounds	Pounds	Pounds
Less than 15	0.66	1.3	13	8
15-25	0.66-1.00	1.3-2.0	13-20	8-12
More than 25	1.33-2.00	2.7-4.3	26-40	16-25

The suggested amounts of materials to apply given in the tables are for band applications under the spread of the branches. When the materials are broadcast over the entire orchard floor it may be necessary to increase the rate of application in order to obtain the same tree response as the band applications. Fertilizer materials other than those given in the tables may be used so long as they are applied at rates which provide equivalent amounts of nitrogen and potassium.

The tree's magnesium and calcium requirements can best be met by maintaining an adequate dolomitic liming program. The pH of orchard soils should be maintained between 6 and 6.5 if a soil test shows that the pH of the soil is 5.5 or below, magnesium sulfate sprays should be applied to prevent possible occurrence of magnesium deficiency. It takes from 3 to 5 years before dolomitic limestone is effective in correcting magnesium deficiency. When magnesium sulfate sprays are used apply 2 to 3 sprays of epsom salts at the rate of 20 pounds per 100 gallons of .

water. These sprays should be timed by calyx, first, and second cover sprays. To avoid possible incompatibilities the epsom salt sprays should not be combined with the regular insecticidal and fungicidal sprays.

Boron should be applied to orchard soils every three to five years. Borax is the most common material used. The rates of application per tree vary with age and size. Apply one quarter pound of borax to young trees, one-half to three-quarters pound to medium age and size trees, and three-quarters to one pound to large or mature trees. In no case should the rate of one application of borax exceed 50 pounds per acre.

The amounts of fertilizer applied to trees which have received annual applications of 200 pounds or more of hay mulch per tree may be materially reduced or entirely eliminated. Tree performance should serve as a guide in determining the extent to which the rates of fertilizer may be reduced.

In young non-bearing orchards it may be possible to produce sufficient high quality mulching material for the young trees by broadcasting 500 to 800 pounds of mixed fertilizer per acre. Place the mulch in a band under the spread of the branches. The amount of fertilizer required for the trees with this system of culture will vary with the quantity and quality of mulch applied around each tree. If the trees are not making sufficient growth one-eighth pound of ammonium nitrate per year of tree age may be applied to the mulch.

---W. D. Weeks

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SOCIAL SECURITY LAW AMENDMENTS WHICH AFFECT FARM EMPLOYERS AND SELF-EMPLOYED FARMERS

1956 Social Security Law Amendments

I. WHEN ARE FARM EMPLOYEES COVERED?

Beginning with January 1, 1957 a farm worker or employee's wages are covered and the employer (farmer) is required to deduct social security taxes from wages IF:

A. The worker is paid \$150 or more in cash during the year for either piece-work or time work.

or

B. If the worker does farm work on 20 or more different days during the year for cash pay on a time basis (rather than on a piecework basis) then his pay is covered regardless of the amount of wages.

II. RATES OF TAX on both self-employed farmers' income for social security and farm employees' wages are increased after January 1, 1957.

III. WHAT DO FARM EMPLOYERS HAVE TO DO?

Farm employers must:

- A. Keep a record of the farm employee (worker) 's name, address and social security number.
 - B. Keep a record of the days on which the employee worked and the amount of cash wages paid and whether on a piecework or a time unit basis (an hour, a day or a week).
 - C. If you have an employer's identification number now you will continue to use the same number. If you don't have such a number write or ask for one at your social security office or the District Director, Internal Revenue Service, Boston 15, Massachusetts, right away. The form to request is SS-4.
 - D. After any month or series of months when the total tax amounts to \$100 you must deposit the social security taxes you withhold from your workers together with your share as an employer. The rate is 2-1/4% of employee's wages and 2-1/4% from you. You use form 450 (Federal Depositary Receipt) and make the deposit in a Federal Reserve Bank or in a bank approved to accept such deposits. You will need to request this form from the District Director the first time you need to use it.
 - E. When your employee leaves your employ or at the end of the year you must give him a statement of total wages paid and social security taxes withheld, with his name, address, and social security number and your name and address as employer, as well as the period during which wages were paid. You can get form SS-14 to use for this purpose if you ask for it from the District Director, Internal Revenue Service, Boston 15, Massachusetts.
 - F. You must file form 943, Employers' Annual Tax Return for Agricultural Employees before January 31, 1958.
 - G. You need your own social security number as a self-employed farmer,
- IV. WHAT ARE THE RATES OF SOCIAL SECURITY TAXES BEGINNING JANUARY 1, 1957?
- 2-1/4% of wages paid employees and 2-1/4% paid by employer -- total 4-1/2%.
- 3-3/8% of income for social security purposes of self-employed farmers--limit of \$4200 of net income.

V. RECORD SHEET

Following is a sample form that might be helpful for keeping records. One or more of these forms must be filled out for each employee.

Social Security Number

Address _____

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Date of payment	Period employed including Dates and Units of Work (days, hrs,piecework, units)	Wage Rate	Total Wages for Period	Employees Social Sec. Tax withheld 2-1/4% of total wages	Employers share of tax 2-1/4% of total wages	Total Social Security tax payable
			Total	Total	Total	Total

---L. D. Rhoades

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TIPS ON INSECT AND MITE CONTROL

If you grow STRAWBERRIES there is no longer any reason to lose plants or to have them weakened by soil insects such as grubs or wireworms. It costs very little to treat the field before setting plants.

Heptachlor, dieldrin, aldrin or chlordane are effective but different amounts are needed per acre or per 1,000 sq. ft. These insecticides are available in different formulations - dusts, wettable powders, emulsifiable concentrates and granulated - and at varying concentrations of actual chemical.

Be sure to read and to follow directions on the label and know the size of your field. It is important to broadcast evenly the right amount of the material you find most economical. There are more details on this and other strawberry problems in the 1957 Pest Control Chart for Strawberries.

If you grow PEACHES you may be wondering about a pest control program for this year with no crop in sight and possible winter injury to the trees. Here are some suggestions.

Do not apply any oil to peach trees this year even though you may have planned to control lecanium scale. Oil could cause additional injury on weakened trees.

Weak trees are even more susceptible than healthy trees to borer attack, especially the lesser peach tree borer. Eggs are laid in rough places anywhere on the limbs, not just on the trunks.

You can prevent borer injury and a serious build-up in the population of borers with sprays of parathion (2-100) or EPN-300 (1-1/4-100). Malathion is not nearly so effective and DDT would favor an increase in mites.

Spray thoroughly so as to cover all the bark of limbs, crotches and trunks on all peach trees both young and old.

Put on the first spray about June 25 and follow it up with two more at 3-week intervals.

APPLE growers are urged again to put their orchards on a 3-year rotation for oil - more often does no harm. A thorough application of a superior type oil once every 3 years can save you some future headaches.

It is the best way to knock out San Jose Scale. You are killing red mite in an entirely different way, thus preventing or at least delaying the development of resistant strains. These are outstanding reasons; there are many other advantages such as making sure the sprayer is all set to go.

If you grow aphid-susceptible varieties such as Spy, Gravenstein, Baldwin, Cortland, Greening or Red Delicious include some insurance against rosy aphid in you plans. They did not cause much trouble in 1956 and no one can predict accurately what will happen in 1957. We do know that 1956, throughout the summer and fall when the rosy aphid is on plantain, was very favorable to many other species of aphids.

If you grow BLUEBERRIES in sod and are troubled by Japanese beetles, grub-proofing that sod will at least keep them from breeding right there in your own field, of course it won't stop them from breeding in other turf and flying in to your berries.

It tells how to grub-proof turf with heptachlor, dieldrin or chlordane and how to protect fruit from beetles in the 1957 Blueberry Chart and in Extension Leaflet #295.

Perhaps you can get neighbors to grub-proof their essential turf with one of the insecticides and then, to bring about an ultimate and permanent reduction in the number of beetles, make sure that you or someone in the area put some milky disease spore powder on some turf that will never be treated with a chemical.

---E. H. Wheeler

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PRUNING AND FERTILIZATION OF WINTER - INJURED TREES

The sub-zero temperatures during the week beginning January 14th killed the majority of peach flower buds in Massachusetts orchards. In addition, considerable peach wood has been injured.

The lowest temperature recorded in the University of Massachusetts peach orchard was -22°F. on January 14th. Observations reveal that all peach flower

buds are killed as are many leaf buds. Considerable wood injury is also evident. All flower buds on the sweet and sour cherries and on the plums appear to be dead. A few apple flower buds and more of those on pears show injury.

Growers can determine whether a flower bud is alive by cutting through it longitudinally. A darkened area in the center indicates that the flower parts have been killed. Wood injury in the tops of the trees can be determined by cutting longitudinally the one, two or three year old wood. If the wood is injured, it will be light to dark brown in color depending upon the severity of injury. Non-injured wood is whitish. To be sure what non-injured wood looks like examine wood on branches that were covered by snow. In addition, examine suckers that can be found at the base of some trees.

Peach Trees - Pruning of peach trees should be delayed until, or just after bloom. At this time leaf growth will have progressed sufficiently to distinguish between living and dead wood. If there is considerable wood injury, prune the dead wood only. Postpone all other pruning on these trees until another year to allow as much recovery as possible. It has been reported in many instances that following wood injury heavily pruned peach trees die whereas trees not pruned or lightly pruned make satisfactory recovery. Rate of fertilization should be reduced according to severity of injury.

Peach trees having nearly all flower buds killed but with little or no wood injury, can be pruned in the normal manner. Fertilizer applications may be reduced or omitted depending upon previous vigor of trees.

In case of older peach trees having severe winter injury, growers may prefer to remove these and replant. However, past experience in other localities has shown that many severely injured trees made remarkable recovery if not pruned.

The grower should be continuously on the alert for signs of winter injury. In the past, some types of winter injury were not observed until during or at the end of the growing season.

Apple Trees - At the time this article was written, no definite wood injury to apple trees has been detected and only a few flower buds were killed. However, growers should be on the alert for winter injury. If and when we have evidence of winter injury of apple wood, growers will be informed.

A high percentage of McIntosh apple trees in Massachusetts had a light crop which is favorable from the standpoint of winter injury. Trees with light crops and healthy foliage accumulate an abundant supply of food materials in the wood and bark tissues which is an important factor contributing to winter hardiness.

Other factors in our favor are maturity of tissues and the weather preceding the sub-zero temperatures. The wood and buds acquire resistance to cold. Low temperatures or sudden drops in temperature in late fall or early winter before the wood of the fruit trees are sufficiently hardened to the cold can cause considerable winter injury.

Many Baldwin trees had a medium-heavy crop. It is common knowledge that apple varieties like Baldwin, Northern Spy, Winter Banana and Gravenstein are tender to cold with Baldwin being considered to be among the most susceptible to winter injury.

Growers should prune first the varieties considered hardy: McIntosh, Cortland, Macoun, Welathy, Milton, Melba, and Early McIntosh. If winter injury is suspected on the more tender varieties delay pruning until extent of injury can be determined.

Some growers pruned in December and early January. These trees should be watched closely especially if large cuts were made.

Pears - In the University of Massachusetts orchards, observations reveal that more pear buds were injured than apple. However, probably enough non-injured buds remain for a good crop. Considerable wood injury has been found in spurs but the effect of the condition on growth this coming season is not known.

---W. J. Lord

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RESULTS OF THE F.F.A. FRUIT JUDGING CONTESTS

The annual fruit judging contest was held January 8, at Worcester North High School in association with the Union Agricultural Meetings. Teams representing Essex County Agricultural School, Norfolk County Agricultural School, Worcester North High School, Templeton High School, Wachusett Regional High School and New Salem Academy participated in this contest. Templeton High School won the team honors, with Essex C.A.S. and Worcester North Placing second and third respectively.

The three boys having the highest combined scores, from this contest and an earlier contest held at Amherst, were chosen for the State judging team and received both medals and cash awards. Donald Stoddard of Templeton, Paul Kelley of Essex and Robert Anderson of Templeton were recipients of these awards.

The fruit judging contest includes the identification of varieties of apple and pear, the United States grades for apple, and insect and disease specimens or blemishes caused by the pests and is excellent training for future orchard personnel.

Much praise should be given to the teachers who train these teams for the excellent results that they have achieved.

---J. F. Anderson

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PRUNING COLD INJURED BLUEBERRIES

Cold injury to cultivated blueberries in the southeastern part of the state has not been severe. The lowest temperature reported was -19° F. several feet above a field. It was probably below -20° in the field. An estimated 5 to 10 percent of the flower buds in this field were injured. Twenty percent of injured flower buds was the most found. The only wood injury observed was in a planting forced into late, excessive growth by very heavy nitrogen fertilization. Even under these conditions the injury was not serious.

The pruning of blueberries should be preceded by a thorough examination of the field for bud and wood injury. Each fruiting bud contains several flower buds. All the flower buds in a fruiting bud are seldom killed unless injury is very severe. The blueberry produces more flower buds than it can mature into fruit and still maintain vigor to produce succeeding crops. A loss of 20-25 percent of flower buds is no more than a good pruning and will not be serious unless followed by heavy pruning. Where many flower buds have been lost, the pruning will need to be reduced in proportion to the loss to maintain a crop. It is well to delay the pruning as long as possible to learn the full extent of the injury.

If there is evidence of wood injury as revealed by browning of the tissues, it is even more important to delay pruning till the full extent of the injury is known. If the wood injury is light, it may be possible to give the bushes a normal amount and type of pruning. If the injury is severe, the injured wood needs to be removed and the crop reduced by thinning out or cutting back of the fruiting shoots remaining. Where injury has been severe, the object should be, not the production of near normal crop, but the minimizing of subsequent effects on the bush by encouraging growth rather than fruiting.

Where propagating is to be done, the whips used should be examined very critically. If any sign of injury is found, they should be discarded.

---J. S. Bailey

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

MARCH 15, 1957

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WHAT DOES ORCHARDING OFFER THE YOUNG MAN

(The following comments by one of New England's outstanding younger fruit growers, were condensed from a talk given by him at a recent meeting of the Nashoba Fruit Producers Association. His "light" is considered too valuable to remain hidden. - A. P. French)

Let us assume that the young man is reasonably intelligent and educated. We start with two basic choices:

1. Plan to work for himself - have his own business.
2. Get a job - in the outside world.

Jobs are plentiful and pay well in many fields today. Industry is crying for young men who have what it takes and can take responsibility.

Today the country is full of high school age boys who are looking for:

1. Big pay
2. Short hours
3. New car

Today many college graduates are looking for and finding the \$5000 to \$10,000 job, 40 hour week, month's vacation, no responsibilities, and let someone else do the worrying.

For me, the basic choice is easy: Work for yourself! I want to make my own decisions, come and go as I wish (This, by the way, is an illusion.), and take no guff from anybody (also an illusion).

First, let's go over some of the points of going into business for yourself - any business - because orcharding today is business, and serious business.

1. It's tougher to make a go of it today than at any time in the past 10 years.
2. Don't go into business without experience.
3. No business was ever built on a 40 hour week. You may work longer and harder and for less than on a job. And, in addition to a 12 hour day, you may worry 24.
4. The same qualities that drive a man to the top as an employee generally make for success in business: broad interests, being a self starter, liking to organize, rising to challenges, a strong sense of self reliance and security, being realistic, and having a desire to achieve for achievement's sake.

If you make the decision to be in the orcharding business, how do you get into it and does it have a future?

Many young men have found themselves in the apple business because their fathers are in it.

Going into business with your father has its good points and its bad points.

A successful father can be a wonderful teacher and guide. The father's worry is: Will the son mature fast enough and accept responsibilities, and make sound decisions?

From the son's point of view, he most often has trouble getting father to loosen the reins. Some fathers just don't seem to be able to let go. Yet they must understand that in order to develop a son who can make sound decisions, he has simply got to let the son make some mistakes and do things the son's way. Mistakes are the greatest teacher.

Father should gradually ease out so that the son is shouldering most of the burdens. At this point the son must remember that father needs enough to keep him busy. He may not want complete retirement. He probably should not have it. So push just enough onto father's shoulders to keep him happy, and ask his advice occasionally (it may be helpful).

There are several other ways of getting into the apple business:

1. Buy an orchard.
2. Plant one and work out until it can pay its way.

Several well known orchardists have become their own bosses by working for someone in orcharding, watching for a good plant to come on the market at a fair price, and then buying.

Working on an outside job while you plant and grow an orchard is probably the toughest way into the business.

What's so good about fruit growing, you ask? Why should I stay in it? Too many, the first test is: Will it pay me financially? The second: Is it a pleasant way of life?

Let's go over the latter first. It is an outside job, with plenty of exercise. It is not monotonous, like putting 259 front wheels on 259 new cars each 8 hour shift. Your work changes with the season, it's interesting, you have challenges and problems to solve, it's competitive.

Remember this: Few occupations can offer you as great an opportunity to exercise your knowledge. You are a fruit grower, but you are also a seller, a buyer, bookkeeper, a keen observer, and must have knowledge of refrigeration, insects, insurance, business principles, finance and economics.

I assure you that the best fruit growers today are no slouches. They're tough competition for you because they are the type who could step into industry and do a comparable job.

Orcharding should enable you to live a fuller family life. You'll see more of your family, have a better opportunity to raise your children, have more contact with them, influence their development, and teach them values.

You can vacation when you wish, your conscience being your guide. There are times in the year when the nose need not be at the grindstone. Much of this depends upon your organizational ability.

You are your own boss, yet that is an illusion, because when you are boss the responsibilities rest with you. If something is done wrong, you, in the end, shoulder the burden. Your customers and your creditors are your bosses.

Will orcharding pay financially? Here the answers range from a deafening NO! to a reassuring YES!

Some growers are seriously concerned about their ability to make a living from orcharding. On the other hand, there are growers who are doing very well financially.

What are the differences between these growers?

Let's go over some of the requirements of a successful operation:

1. How is your orchard site? Be honest when you ask yourself this. For the best orchardist will have a hard time on a poor site. If the soil is poor, or you are exposed to frosts, winds, hail more than occasionally, it's a poor bet to start. Orchard sites so strongly affect orchard income that putting capital into a poor site is like throwing it away.

2. The grower himself. Do some soul searching on this one.

3. Size of unit. Are you big enough to afford machinery and labor and investment in a storage and turn out apples at a fair cost per bushel competitively?

4. Details. We can lump a number of things under this category. Do you produce good volume consistently? Not too many ups and downs? If not, why? Some small detail such as pollination, or soil management? A consistent volume of good fruit! That to me is the KEY. Have apples and good apples every year. If you are not producing consistently, there is a reason for it and it's your job to find it.

Fortunate is the grower who has a crop in a "short year". Yet there are growers who consistently come through with better than average crops on these years.

Keep your operation in tip top shape and when one of these short crop years comes along, you can hit it hard, and put that money back into the operation to enable you to do it again.

With production and quality you can't go wrong. True - you may just coast and squeeze by in a poor market year. You probably would have done better with your capital invested elsewhere. But in a good market year, you should make better interest on this capital than it would do in industry.

Remember this is not a 2, 4, or 6 year adventure. It's a long term proposition. Plan it that way and see how you do over a 10 year period.

If your apples aren't bringing the top of the market, find out why, and do something about it.

Any future, you ask? I believe we have to grow bigger, combine small units, and all face this common enemy: disorderly marketing. It's a long subject, marketing, and a distressing one. It is the fruit and produce growers' weakest point today. You have an instrument in your N.Y. & N.E. Apple Institute that can be of tremendous aid to you. Support it and nourish it, and tie it to some sort of controlled marketing and we will have arrived.

The population of this country is growing. It is inconceivable to me that people will give up eating apples.

---W. H. Darrow, Jr., Putney, Vermont

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WINTER INJURY TO INSECTS

Insects are cold blooded animals and as such are much more tolerant than warm blooded animals to below normal temperatures. Furthermore, it has been reported that when insects go into hibernation (winter dormancy) a part of the moisture in the body fluid is evaporated so that the remainder is concentrated into an antifreeze liquid which resists the formation of ice crystals at below freezing temperatures. However, there is a limit to such phenomena, and temperatures of -15° F. or below kill many unprotected insects.

Observations this winter indicate a high mortality of San Jose scale, codling moth, bud moth and several minor fruit pests which hibernate on the exposed parts of the trees. However, in each case observed, a few live insects have been found. Eggs of European red mite and the apple infesting aphids appear to have suffered little injury and a normal percentage of them look natural.

Of course, some of the more destructive pests such as plum curculio, apple maggot and red banded leaf roller were under 15 inches or more snow and well insulated from severe cold. Likewise, the snow protected any of the scales, aphids and worms which were on low hanging branches or the lower part of the tree trunk.

From the control standpoint, this means that growers cannot relax from their regular spray or dust program, but should expect better results following reduced numbers of some pests.

Where there is any evidence of winter injury to the buds or bark, especially the bark, it is unwise in most cases to apply dormant oil this year. Otherwise, the regular program as outlined in the Pest Control Schedule should be followed.

---W. D. Whitcomb

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TREATMENT OF GIRDLED TREES

Fruit growers should be continually on watch for girdling or partial girdling of their fruit trees by mice so that they can make plans for repair of this damage. It is difficult to find desirable scions for bridge grafting and trees for in-arching in late May and June as some fruit growers found out last year.

How Much Damage is Necessary to Warrant Repair?

How much of the trunk circumference may have the bark removed and still leave the tree capable of its functions is not known for certain, but it is estimated that if the bark is removed from a quarter of the way around the trunk the tree will be somewhat crippled. On the girdled side of the tree, the roots will eventually become starved since there is no appreciable lateral movement of food materials. If the amount of removed bark and cambium is not great in extent, however, the uninjured cambium should form new wood and bark to replace that which has been destroyed. Wound dressing in the early spring is always helpful even to these less extensive injuries.

It usually does not pay to bridge graft trees that have been completely or almost completely girdled for a year or more. These trees are generally in such a low state of vigor that they will not respond to the treatment. However, some success has been reported when apple trees were bridge grafted the second spring after winter injury to the trunk.

In the case of complete girdling of the trunk, the trees may be treated in any one of several different ways, the choice depending on the age of the tree, species of tree, tree vigor, and the growers preference.

Determining the Treatment

1. The tree may be pulled out and replaced by a better one.

2. If the apple or peach tree is only one or two years old it may be cut off two or three inches above the surface of the ground or below the girdled area. Usually many shoots will develop from the remaining stub. One of these may be selected next spring and a new tree grown from it. Care must be taken, however, to see that the shoot selected comes from above the union of the stock and scion, otherwise the grower will get a seedling tree instead of a new tree of the variety originally set.

3. If the apple tree trunk is one and a half to two inches in diameter, the trunk may be cut off and two scions of the desired variety may be cleft grafted into the trunk.

4. When the trunks of girdled apple trees are more than two inches in diameter and where the top is worth saving, bridge grafting is probably most feasible.

5. When the roots of an apple tree are so badly injured that scions cannot be readily attached to them, inarching should be done.

6. Peach trees generally do not respond so satisfactorily to bridge grafting. However, Prof. O. C. Roberts stated that he has grafted peach trees successfully with plum scions.

Season for Repair Grafting

Repair grafting should be performed when the bark is slipping readily which is about the time the trees are starting growth. If and when attempting to bridge graft the bark doesn't slip readily, the inlay graft may be used.

Selection of Scion Wood for Bridge Grafting

It usually is necessary to obtain scions in advance of their use in order to have them dormant. Water sprouts or well ripened one year terminal growths make good scions for bridge grafting. Scions can vary in size from that of a lead pencil to one half inch in diameter, the largest scions being used on larger wounds. Scions may be taken from the same tree or any other available compatible sort, but preferably from a winter hardy variety such as Cortland or McIntosh.

Seedlings for Inarching

Use dormant small seedling or nursery trees 3 to 6 feet in height.

Mechanics of Repair Grafting

limited number
Farmers' Bulletin #1369 U. S. Department of Agriculture give in detail methods of bridge grafting and inarching. A ~~copy~~ of this publication can be obtained from the ~~Pomology~~ Department, University of Massachusetts, Amherst or from your County Extension Service.

Grafting Compound

For structure
For the protection of grafting wounds, many growers now use asphalt emulsion instead of a grafting wax. It can be obtained from most distributors of farm and gardening supplies. Asphalt emulsion should be applied on the tip ends of the scions and the exposed edges of the bark on the trunk when bridge grafting is completed. Applying the emulsion on the injured section of the trunk will prevent weathering.

The Number of Scions

The following are about the right number of scions for different sized trees:

- (1) Tree 2 inches in diameter, 3 scions
- (2) Tree 3 inches in diameter, 4 scions
- (3) Tree 6 inches in diameter, 6 scions
- (4) Tree 10 inches in diameter, 8 or 10 scions.

On partially girdled trees use a proportionate number of scions. Tree one-quarter or more girdled should be bridge grafted.

Care of Scions After Grafting

It is necessary to keep the scions from producing shoots. As buds on the scions swell, rub them off.

General Considerations

1. As soon as the injury is discovered, it may be possible to save some of the cambium layer cells by promptly applying the asphalt emulsion or grafting wax.

2. Occasionally suckers are present or arise later from the area below the wounds. Some of these suckers that extend above the wounded surface may be used as "inlay scions" at the top end.

3. Trees leaf out and often fruit the first season after the bark and cambium layer are destroyed around the tree trunk! However, the vigor of these completely girdled trees vary considerably. On some trees the foliage and fruit appear normal; foliage may be light in color but fruit size normal; and on other girdled trees the foliage may be light in color and sparse and the fruit small.

The reason why completely girdled trees leaf out and often fruit the first season after the bark and cambium layer are destroyed around the tree trunk is because water and other materials which are taken up by the roots from the soil pass up to the leaves through the wood. In the leaves the water and the carbon dioxide taken from the air by the leaves are united chemically, through the action of sunlight, into glucose sugar. This sugar is the starting point for the synthesis of all other carbohydrates and in turn for proteins, oils, waxes, and other organic compounds which make up the bulk of the apple tree. After the manufacture of the plant foods by the leaves, they move to other parts of the tree through the phloem which is found in the bark. From the facts presented, it can be seen that complete girdling will not deprive the top of the tree of water and other materials necessary for the manufacture of plant foods and that these materials will be transported to all plant parts above the injured area.

Reserve food stored in the roots enable the roots to function for some time, often a year or two, thus keeping the top of the tree alive. However, a completely girdled tree, unless repaired, will eventually die from starvation of the roots for carbohydrates!

---W. J. Lord

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FUNGICIDE COMBINATIONS

The accompanying table indicates some of the advantages gained from mixing fungicides in half and half strengths. Twelve categories are considered. Combining two fungicides can contribute to more general control of diseases and to better control of apple scab. The softening action of one on the other, each at half strength, would improve safety and tolerance without losing any of the virtues of either material at full strength. Improved wetting, nutrition, back action, protectant action against scab and economy may be combined in one spray by selecting two compatible materials each at half strength.

The gains apply to the early sprays and in the primary scab infection period up to mid-June. Thereafter, the single fungicides are used at reduced strength and preference is given to the materials leaving the least objectionable deposit, having the greatest residue tolerance and leaving the fruit in the best natural finish.

---E. F. Guba

TABLE. GAINS FROM INDIVIDUAL FUNGICIDES AND COMBINATIONS

xxx indicates good, high best for the category
 0 or x indicates none, poor, low; xx indicates intermediate

MATERIALS	Waiting Sticking	SCAB			RUST		Leaf Injury	Compatibilities	Foliage Nutrition	Residue Tolerance	Cost	Fruit Finish	
		Protection	Back Action	Eradication	Protection							McIntosh Early	Late
Full Strengths													
Glyodin	xxx	xxx	0	0	x	0	x	x	0	xx	xx	xx	xx
Dichlone	x	xxx	xx	0	x	x	x	xx	0	x	xx	xx	0
Mettable Sulfur	x	xx	0	x	x	x	x	xxx	0	Exempt	x	xx	x
Ferbam	x	xxx	0	0	xxx	0	xxx	xxx	xx	xx	xx	xxx	xx
Thiram	x	xxx	0	0	xxx	0	xxx	xxx	0	x	xxx	xxx	xxx
Captan	x	xxx	x	xx	x	x	xxx	xxx	0	xxx	xxx	xxx	xxx
Mercury	0	xx	xxx	xxx	x	xx	x	xxx	0	0	xxx	x	0
Half & Half Strengths													
Ferbam-Sulfur	x	xxx	0	x	xxx	0	xxx	xxx	x	xxx	x	xxx	x
Ferbam-Dichlone	x	xxx	xx	0	xxx	0	xxx	xxx	x	x	xx	xxx	0
Ferbam-Captan	x	xxx	x	xx	xxx	0	xxx	xxx	x	xxx	xxx	xxx	xx
Glyodin-Mercury	xxx	xxx	xxx	xxx	x	x	xxx	xxx	0	0	xxx	xxx	0
Glyodin-Ferbam	xxx	xxx	0	0	xxx	0	xxx	xxx	x	xx	xx	xxx	xx

ROOT ACTIVITY

It is commonly known that the function of root systems is to supply water and nutrients required for synthesis of food for tree and fruit growth. However, the active part of the root system in this respect is not the large main roots but the microscopic root hairs that are in intimate contact with small colloidal particles of clay and humus. It is these root hairs that actually absorb water and nutrients from the soil.

Root hairs are short lived structures and often die within a week or less. Thus, they must be constantly formed so that the tree will get sufficient water and nutrients. These new root hairs develop continuously throughout the season whenever temperature, moisture and aeration of the soil is favorable. Research findings show that root growth is very limited during the winter months, therefore, most of these root hairs if not all must be regenerated at the beginning of each growing season.

Growers know that fruit trees do poorly or fail to survive on soils having inadequate drainage. In such soils, at sometime during the growing season the amount of oxygen in the soil is insufficient for formation of new root hairs. Without oxygen root hair growth cannot occur. A representative silt loam soil when in optimum condition for plant growth contains approximately 50% pore space being less for sandy soils and greater in soils containing clay. For optimum conditions for root hair growth about half of this pore space should be occupied by water and the rest by air.

Early root activity is necessary for adequate moisture and nutrient uptake by fruit trees before bloom. Without this, spur leaf area will be small and fruit set may be reduced. Sufficient root activity early in the growing season necessitates good soil aeration and soil management practices. In wet seasons, trees planted on poorly drained soils may be water logged during the first part of the growing season. In such instances, root hair activity will be confined to the surface layer and thereby the leaves and fruit may suffer for the lack of oxygen and nutrients. These trees, unless the soil is tile drained, are apt to be non-profitable to the grower.

Growers should strive to apply their fertilizer to the fruit trees at least two to three weeks before bloom in order that the root hairs will be supplied with sufficient nutrients for uptake.

---W. J. Lord

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POMOLOGICAL PARAGRAPH

Tree Girdling by Mice

The writer has noted very little girdling of fruit trees by mice in orchards visited during February. Apparently many fruit growers conducted a thorough baiting program because mice were abundant in most orchards last fall. This does not mean, however, that growers do not have to be on the alert for signs of girdling. Mice may have caused considerable damage in some orchards.

---Editor

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FARM FAMILY FINANCIAL PLANNING

A farm family which owns a farm will gain financial security usually to the extent that they can make and carry out sound plans in the areas of family financial management which follow:

Credit. Keeping the use of credit within the means of the family to repay takes some doing but is a big factor in a security program. The feeling of security which results from a good credit standing which can be called upon in times of family or business need and stress cannot be measured.

Savings. The typical farm family saves first by buying and paying for a farm business, and by adding to the value of this farm property. Sometimes savings in the form of investments or life insurance supplement the farm investment but the major savings program usually is investing in the farm business.

General Insurance. No farm owner should feel secure without insurance protection. One catastrophic fire, a costly accident to the hired man or just one mistake while operating a motor vehicle on a public highway and a lifetime of work in building up financial security and savings can be wiped out.

Life Insurance. Farm people buy less life insurance than any comparable group. Life insurance can be both a protection and an investment. Farmers need life insurance mainly as protection for the family in case of death of the farm operator since farmers use their farm as an investment. To insure an adequate income to the family in case of death of the farm operator usually life insurance is needed, even when the family owns a large farm free from debt.

Retirement Plans. Farmers like other people live longer and many, indeed too many farm families make no plans for retirement. No one should plan to operate at full tilt for life. Savings in the form of farm property alone often prove inadequate to provide a retirement income that is satisfactory. Few farm owners can retire on the income from the proceeds of the sale of the farm at age 65 or even 70 or 75. Social security protection and benefits apply to farmers and their dependents and needs to be considered as part of an overall plan.

Estate Plans. Very Often a widow or an estate cannot operate a farm business at a profit. Definite plans as to disposition of the business in the case of the untimely death of the operator should be made. Every farm owner should have a will. Plans for the sale or operation of the farm at his death should be made by the owner with his wife.

Actually these problems are all part of the same problem although we commonly make the mistake of looking at each of them separately.

It is increasingly important that you take the time for a real look at your plans for family financial security. Dollar investments in the farm business are increasing and the need for planning ahead is becoming much more necessary and important.

---L. D. Rhoades

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FURTHER NOTES ON WINTER INJURY

At the present time, except for some browning of the sapwood back of the buds, no definite wood injury to apple trees have been detected in Massachusetts orchards. Little or no injury has occurred to fruit buds of apples. Only in one orchard have we found considerable fruit bud injury and that was on Gravensteins. Some of the Gravenstein branches were cut off and placed in water at room temperature. It was noted that there were only 3 or 4 blossoms to a cluster instead of the usual 5-7.

Sour cherry fruit buds appear to be more winter hardy than those of sweet cherry. Many of the fruit buds of sour cherries blossomed when twigs cut from trees in the University orchard were placed in water and kept at room temperature. On the other hand none of the sweet cherry fruit buds opened when the twigs were treated in a similar manner.

In many orchards in Massachusetts, the leaf buds of peach trees appear to have suffered less injury than those in our University orchard where temperatures of -22°F. were recorded.

It is reported in the Produce News that some areas of New York may have enough undamaged peach fruit buds for a 15 to 25 per cent crop. Other areas will have no peaches and many trees may not survive. In Monroe and Wayne Counties in New York, a few blocks of Baldwin and Greening apples may have some damage. "Damage is to the sap wood back of the buds. A hot or warm dry spring would intensify this damage, while a cool, moist spring would minimize it. Some growers fear that fruit may bloom and then drop badly."

In many instances the primary buds on grapes have been injured but the secondary buds unharmed. In these cases the secondary buds will probably grow and may bear a partial crop.

Growers should be on the alert for signs of winter injury to fruit trees. Some types of winter injury may not appear until late spring or summer.

---W. J. Lord

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"FLOATER" INSURANCE

Originally property insurance coverage was largely written to cover loss or damage resulting from fire. Later coverage was extended to provide indemnity for losses and damage from other causes.

To cover losses from many causes particularly on property which might be sometimes located in one place and sometimes in another, a kind of insurance called "inland marine" or "floater" coverage was developed. Policies of this type adopt a quite different approach to insuring risks from the simple fire insurance policy.

"Floater" coverage is commonly written to cover all risks and locations with relatively few exceptions.

"Floater" policies are written either to cover specific property such as your wife's fur coat or your valuable camera, or may cover a schedule of property such as livestock on your farm or movable farm equipment. Where inventory of machines and livestock and values vary, a monthly schedule may be used to keep premium costs low.

This type of "all risk" insurance is the only way that many companies provide such coverage as "theft" protection on livestock, for example.

By all means discuss with your agent or broker the possibility of using this type of insurance to cover certain kinds of your property which is subject to risks of damage or loss that are likely to occur as well as fire or damage resulting from fire. This type of comprehensive coverage might be of particular interest to poultrymen or dairymen whose numbers of livestock vary during the year or who keep birds of varying ages in several locations or other farmers whose inventory of products varies widely during the year.

---L. D. Rhoades

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APPLE SCAB CONTROL MATERIALS FOR 1957

A grower needs to know thoroughly the scab spray materials and what he can expect of them for control if he is to get the most out of his scab control program. The following is a presentation of the available scab control materials.

Sulfur: Some growers continue to get good scab and black rot control with sulfurs and it may be well for growers to take another look at them, especially since sulfur is the only scab fungicide which also controls apple powdery mildew. The paste and fine particle dry-wettable sulfurs, either alone or at half strength in combination with another scab protectant, may be used through the primary infection period. After second cover, there is risk of fruit scald if the weather turns hot and it can happen even when sulfur has been applied during a cool period a week or more before the hot spell. It does not occur every year, but when it does, it can cause serious loss. Since there are safer summer scab spray materials than sulfur, it is well to use one of them. If it should be desirable to use sulfur in cover sprays, as would be the case if apple powdery mildew showed up in summer, a coarse sulfur, 325 mesh, at 2 to 3 lbs. would be a little safer than the paste or fine particle sulfurs.

Adherence to foliage is an important characteristic of a scab fungicide and the paste forms are better in this respect than the particle forms -- maybe that is why they usually give slightly better scab control. After about one inch of rain the particle forms, as with all powder fungicides, may need to be replaced to maintain protection.

A sulfur dust comes in handy for emergency protection when there is not enough time to apply a spray and either spray or dust may be used in bloom.

Sulfur combines well with ferbam, glyodin, dichlone, and, according to the manufacturer, even with captan. It is not safe with oil and when used with lead arsenate, may cause some leaf injury. It has no "kickback".

Ferbam: This carbamate is strictly a protectant fungicide with no "kickback" action. It controls scab well and is still the standard fungicide for controlling cedar-apple and quince rusts, Brooks' spot, and bitter rot. It may be used alone but also does well at half strength with half strength sulfur, dichlone, glyodin, or captan. It is safer than sulfur with lead arsenate on Baldwin and Red Delicious.

Ferbam is the only scab fungicide that is recommended with oil in Delayed Dormant. It is not compatible with all oils and the grower should determine how it mixes, with the oil he plans to use, before he uses such a combination. Some growers prefer to put on a separate spray or dust of ferbam, if needed, rather than use a ferbam - oil combination. Ferbam may be used in bloom.

Dichlone: This organic fungicide is an excellent scab fungicide and also controls frog-eye leaf spot and rusts. It may be used as a spray or dust for primary scab control through calyx. It is not used in the covers.

At full dosage, in an all season program, it tends to cause leaf chlorosis, some fruit spotting or russetting, and a noticeable reduction in fruit set in subsequent years. It is most commonly used at half dosage with half dosage sulfur or ferbam or as a 3% actual dichlone dust for airplane application. The dust is also applied with ground equipment, or a spray may be used, toward the end of a prolonged wet period or when "kickback" is needed. "Kickback" is about 40 to 50 hours at 50°F. when applied to wet trees. Better results may be obtained at full dosage in a rain application than with reduced dosages. If needed, it may be used in bloom with no injury except browning of flower petals.

The older dusty formulations of dichlone caused an uncomfortable skin irritation for some spray operators. The new dustless dichlone is claimed to cause less skin irritation.

Dichlone is not compatible with oils and phenyl mercuries.

Glyodin: This is a liquid fungicide which gives very little residue, a fine fruit finish, and excellent scab protection. It is persistent and is not washed from the leaves easily by rain but has no "kickback" value.

It controls Brooks' spot and sooty blotch but not black rot, mildew, or rusts. For rusts, it is necessary to use ferbam in combination with glyodin at half dosage of each.

It has given very good scab control when used at half dosage with half dosage of phenyl mercury. The combination gives good protection and about 72 hours "kickback".

Glyodin should not be used with oil and with liquid insecticides such as TEPP and TDE (DDD). It has a tendency to cause leaf scorch when used with lead arsenate on Cortland, Baldwin, R. I. Greening, and Red Delicious. When used with lead arsenate, if no mercury is in the spray, an equal amount of fresh spray lime may act as a safener.

Concentrates of 4X or over and over application may cause some fruit russet, especially near the machine.

Excessive foaming may be reduced or prevented by adding the glyodin to the tank when it is nearly full or by using 2 oz. of fresh spray lime or 1 pint of kerosene per tank.

Captan: One of the newer materials which already has found a place in fruit growing because of excellent scab control and excellent fruit finish. It is one of the safest fungicides for easily russetted varieties, especially Golden Delicious.

It controls Brooks' spot, and black rot, but not mildew, sooty mold, and rusts. If rusts are a problem, use captan-ferbam combination, one half dosage of each.

It gives "kickback" up to 18 or 20 hours at 50°F. and also suppression of spore development on scab spots but no "burn out". For longer "kickback", up to 72 hours, combine half dosage each of captan and phenyl mercury.

It combines with lead arsenate, DDT, and most other organic insecticides and fungicides, but is incompatible with lime, oil, oil-type stickers and emulsifiable insecticides such as TDE. Over application may cause spotting, yellowing, or burning of leaves on Red Delicious, Baldwin, and Stayman, especially around calyx and first cover.

Niacide A and Niacide M: These are new names for what were formerly Vancide A and Vancide M. They are scab protectants which are relatively new but which have given good control and good finish in tests and limited grower trials.

Both Niacides are mixtures of several materials. Niacide A contains ferbam and thiram along with other materials and is a dark wettable powder. Niacide M has no ferbam in its formulation, but does have thiram. It is light in color.

The manufacturer suggest Niacide A at 2 lbs. through first cover, 1-1/2 lbs. in second and third cover, and 1 lb. in later covers, but not closer than 30 days to harvest and removal of excess residue at harvest. Niacide M is suggested at 1-1/2 lbs. in early covers and 1 lb. in late covers in place of Niacide A for less conspicuous residue with applications not closer than 30 days to harvest and removal of excess residues at harvest. On spray sensitive varieties such as Golden Delicious, Niacide M at 2 lbs. is preferred to A in pre-cover sprays.

Thiram: This fungicide has been known to agriculture for some time, but only recently has it been seriously suggested for use on apples. It seems to have excellent scab control properties; it controls rusts and other diseases, and produces excellent finish. Its light color makes it suitable for summer and late season use. There is still need for testing and observation under a wider variety of weather and grower conditions.

---C. J. Gilgut

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

APRIL 15, 1957

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- Refrigerated Apple Storages in Massachusetts—1956
- Fertilization of Apple Trees with Poultry Manure
- Woodchuck Control in the Orchard
- Chemical Thinning of Apples
- The Influence of Preharvest Drop Control
Materials on the Amount of Internal
Breakdown of McIntosh



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Contributors to this issue from Supporting Fields

Wesley R. Jones, Assistant District Agent, U. S. Fish and Wildlife Service

SMALL FRUIT DISEASE CONFERENCE

A small fruit disease conference was held on February 18 and 19 at the U.S.D.A. Research Center at Beltsville, Maryland. About a hundred small fruit specialists, growers and nurserymen from all over the United States and Canada were in attendance.

The strawberry virus situation was discussed in considerable detail. It was apparent that from the standpoint of the research man this is a very complex problem. Much work is being done, but much more is needed. From the viewpoint of the grower the essentially virus-free stocks are so much better than the non-virus-free that every grower should demand them.

At present the difficulty is to maintain these essentially virus-free plants in that condition through the several years it takes to multiply them sufficiently so that all growers can be supplied. Eight states, California, Tennessee, Michigan, New Jersey, Ohio, Maryland, Delaware and Arkansas have established, or are in the process of establishing, a system of inspection and certification or registration of essentially virus-free strawberry plants. In these states there is some supervision over the production, and control over the sale, of such plants.

In Massachusetts there is no such arrangement. A few plant growers, because of carelessness or ignorance, are offering plants for sale as essentially virus-free which are not. The progressive plant growers are doing a good job of supplying quality plants which are essentially virus-free. It is up to the strawberry grower to be sure that he deals with the latter kind of nursery.

Attempts are being continued to produce virus-free plants by heat or chemical treatments. So far heat treatment has been successful in inactivating some but not all viruses. One case has been reported of inactivating a virus with a zinc salt.

The fight against root infesting nematodes in strawberries continues. The root knot and meadow nematodes which work in the roots continue to be the most general and worst offenders. In Florida the sting nematode which works on the outside of the roots is their worst offender.

A new nematocide 1,2-dibromo-3 chloropropane (sold under the trade names Fumazone and Nemagon) received considerable attention. This material is not toxic to strawberries as are the commonly used soil fumigants DD and ethylene dibromide. On the other hand it is much slower acting. It has been found to be very effective against root knot nematodes. It is being prepared in granular form which makes it much easier to apply.

Red Stele was discussed briefly. Two or three more strains of the disease have been found in northwestern Canada, making a total of 5 or 6 strains. The only control measure is still the use of red stele resistant varieties.

Verticillium wilt of strawberries was discussed at some length. It is the most serious disease of strawberries in California. It can be controlled by fumigating the soil with chloropicrin, but this is too expensive at present price levels out there. As a result, some strawberry land is going out of production. This fungus attacks red raspberries, potatoes, tomatoes, egg plant

and many other plants. In both California and New Jersey it is reported to do greater damage to strawberries when they are planted within two years after a crop of tomatoes. Verticillium wilt has been found occasionally on strawberries in Massachusetts. One case was found last summer.

One of the highlights of the conference was a report by Dr. G. M. Darrow on his trip to Chile, South America, in search of breeding stock of the Chilean strawberry. He found fields of strawberries in the mountains which had been fruited continuously for perhaps a hundred years. The berries are so firm that they are hauled to market in large wooden boxes holding 10 to 20 kilos (a kilo is slightly over a pound) in ox carts. They are then dumped in piles in the store windows the way apples used to be dumped in this country. They are quite poor in flavor according to Dr. Darrow.

---J. S. Bailey

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✓ PRUNE THOSE RED RASPBERRIES

Possibly no other fruit suffers more from the lack of pruning than does the raspberry. There are at least three valid reasons why the red raspberry must be pruned annually:

1. The individual raspberry ~~cane~~ lives only two years. The first year it starts as a tender shoot at or near the ground level and develops into a mature, typically unbranched 6 to 8 foot cane by fall. The next season this ~~cane~~ sends out fruiting laterals, blossoms, bears a crop, and then dies.
2. The suckering habit of the red raspberry would soon result in a "brier patch" with weakened ~~cane~~ growth and poor air circulation if no pruning were done.
3. Most pickers would fail to locate and pick too high a percentage of the crop if the rows were left wide and the stand of canes too dense in the row. Many of the lower buds, in particular, fail to develop into fruiting laterals under such conditions.

When and How. In view of the fact that the old fruiting canes die soon after bearing their crop and serve as a source of infection for such diseases as spur blight, all fruiting canes should be removed immediately after harvest is over. Such old green leaves as may still remain on these fruiting canes after harvest have been found to contribute little, if any, food to the plant. Therefore, the sooner they are taken out after harvest the better.

During the late winter or early spring all one year canes of less than average diameter should be cut out. There is plenty of evidence to indicate that the large canes are the most fruitful ones. Having cut out all of the weaker canes, the base of the row should be narrowed to approximately one foot

in width and, if necessary, more canes cut out so as to obtain a spacing of approximately 6 inches or so between remaining canes. This procedure should result in a narrow row having approximately 25 canes per 10 feet of row length. To the inexperienced person a row so treated will appear excessively thin. However, under these conditions the maximum number of buds will develop fruiting laterals, air circulation will be good, and the pickers should find most of the berries.

Heading back of these canes is best delayed until growth has started and one can observe the amount of killing back which has taken place during the winter. In the absence of winter killing, the amount of heading back will depend upon whether or not the canes are to be given support. If support is used, a 5 to 6 foot heading is entirely reasonable, but if they are to be grown without support they should be shortened to about 4 to 4½ feet with most varieties. Otherwise, the weight of the fruit and foliage will cause the canes to bend and the fruit to become dirty in the soil. Longer canes tend to bear somewhat smaller sized fruit which ripens slightly earlier as compared with fruits on canes which are shortened somewhat more. However, since every bud on the cane is potentially capable of producing a fruiting lateral and the greater the length of the cane, the fewer is the number of basal buds which develop into fruiting laterals, there may be little difference in total production between canes that are headed at 4½ feet and 5½ feet.

---A. P. French

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POMOLOGICAL PARAGRAPHS

Winter Injury

Live peach buds were found in two small orchards in Barnstable County. According to one of the growers, the minimum temperature recorded in his orchard during the week of January 14th was -9°F.

In peach orchards visited in Plymouth and Bristol County, little or no wood injury was evident. However, this was not the case in Norfolk County.

Pruning Grape Vines

Frequently when walking out to the orchard during farm visits to discuss pruning of tree fruits, the grower will want to know how to prune that grape vine or vines in the backyard. The leaflet titled "Grape Culture in Massachusetts" describes the training and pruning of grape vines. This leaflet may be obtained from your County Agent or from the Cooperative Extension Service, University of Massachusetts, Amherst.

---W. J. Lord

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REFRIGERATED APPLE STORAGES IN MASSACHUSETTS - 1956

As gleaned from the Fruit Tree Survey the capacity of refrigerated apple storages in Massachusetts totals 2,216,000 buhsels.

Details are shown as follows:

BARNSTABLE COUNTY

Sandwich

3,600

Total - 3,600

BERKSHIRE COUNTY

Adams

4,000

Richmond

9,000

Hancock

300

Williamstown

5,000

Total - 18,300

BRISTOL COUNTY

Acushnet

10,000

Segreganset

2,200

Fall River

5,000

Swansea

4,000

Total - 21,200

ESSEX COUNTY

Andover

650

Methuen

12,000

Bradford

8,000

Peabody

15,500

Hathorne

1,100

Rowley

5,000

Ipswich

5,000

West Newbury

35,000

Total - 82,250

FRANKLIN COUNTY

Deerfield

7,500

Shelburne

59,000

Total - 66,500

HAMPDEN COUNTY

Brimfield

9,500

Three Rivers

13,000

*15,000

28,000

Cranville

70,000

Tolland

E. Longmeadow

12,000

7,000

Westfield

Monson

9,200

7,500

Wilbraham

Southwick

39,000

Total - 158,800

2,400

*15,000

173,800

HAMPSHIRE COUNTY

Amherst

39,000

*4,000

150,000

93,000

Easthampton

16,000

Southampton

6,800

Belchertown

5,000

Ware

9,500

Chesterfield

15,000

Williamsburg

20,000

Total - 111,300

*4,000

150,000

165,300

Bushel Capacity by Counties and Towns

T - Country Point Commercial Storage

* - Controlled Atmosphere Storage

MIDDLESEX COUNTY

<u>Acton</u>	<u>Hudson</u>
42,000	14,000
<u>Ashland</u>	<u>Littleton</u>
47,000	13,000
<u>Billerica</u>	<u>Marlboro</u>
7,700	60,500
<u>Chelmsford</u>	<u>Pepperell</u>
10,600	47,000
<u>Concord</u>	<u>Sherborn</u>
T 220,000	2,200
<u>Dracut</u>	<u>Stow</u>
11,500	105,500
<u>Dunstable</u>	<u>Tewksbury</u>
2,300	4,500
<u>Groton</u>	<u>Westford</u>
10,000	36,000

Total - 413,800
T220,000
633,800

NORFOLK COUNTY

<u>Franklin</u>	<u>Norwood</u>
1,600	2,000
<u>Medfield</u>	<u>Sharon</u>
2,000	650
<u>Medway</u>	<u>Walpole</u>
15,000	1,700
<u>Millis</u>	<u>Wrentham</u>
3,000	15,000

Total - 40,950

PLYMOUTH COUNTY

Lakeville

Norwell

8,400

.50

Total - 8,450

WORCESTER COUNTY

Ayer

Lancaster

T 395,000

4,000

T* 87,000

Leominster

482,000

Ashburnham

24,000

T40,000

1,000

64,000

Berlin

Mendon

25,000

2,100

Bolton

Millbury

30,000

5,000

Boylston

Northboro

4,000

4,700

Brookfield

Oxford

19,000

2,900

Charlton

Spencer

3,000

2,000

Fiskdale

Sterling

8,000

52,000

Fitchburg

Sutton

84,500

14,000

Grafton

Warren

1,500

12,000

Harvard

Westboro

78,000

6,800

*7,000

85,000

Total - 383,500

*7,000

T*87,000

T435,000

912,500

GRAND TOTALS

1,308,650
*26,000
T*87,000
T705,000
2,126,650

---O. C. Roberts

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FERTILIZATION OF APPLE TREES WITH POULTRY MANURE

Poultry manure must be used with caution as many growers have already found out. The application of too much poultry manure may result in nitrogen becoming available late in the growing season, causing poor fruit color and immaturity of wood.

A number of growers use poultry manure regularly and through experience know how much to apply without getting into difficulty. On the other hand, growers using poultry manure for the first time should do so with caution. It may be best to experiment on just a few trees. Poultry manure applied sparingly and broadcast over the area between trees will improve tree and grass growth.

The following facts and figures about hen manure were taken from the Pennsylvania Extension Service publication - "Hen Cackles" April, 1955 issue.

It is difficult to estimate the analysis of poultry manure because of variable amounts of litter it may contain. In addition, as much as 75% of the nitrogen can escape from poultry manure if it remains wet in the houses or is allowed to heat. There may also be loss of nitrogen from oxidation. The losses of phosphoric acid and potash are not as great as that of nitrogen because they are more stable.

The following is the analysis of poultry droppings:

	<u>Water</u>	<u>Nitrogen</u>	<u>Phosphoric Acid</u>	<u>Potash</u>
Fresh and Wet	76%	1.48%	.96%	.47%
Fresh and Dry	16%	5.88%	3.60%	1.65%

A rule of thumb as to nitrogen content of poultry manure: There is approximately one pound of nitrogen per bushel of wet droppings, or three fourths bushel of dry droppings. Three fourths of a bushel of dry poultry manure contains enough nitrogen to meet the nitrogen requirement of a McIntosh apple tree capable of producing 25 bushels of apples.

Nitrogen in poultry manure becomes available to the trees more slowly than in the commercial forms and may benefit the crop for several seasons. Approximately one half of the plant food in the poultry will be utilized by the first crop; one fourth will be available the second year and one fourth the third year.

---W. J. Lord

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WOODCHUCK CONTROL IN THE ORCHARD

Fortunately there are a few orchard pests that don't require the use of a hand lens for identification. That stocky, low-slung rodent, the woodchuck, is one of these. Every farmer is familiar with this pest and its damage. The fruit grower, particularly, has reason to bar woodchucks from his premises.

Probably the first annoyance that will come to the attention of the fruit grower is the chewing proclivity of the woodchuck. Apparently 'chucks chew for the sake of dental exercise when they first become active in the spring. If the den happens to be located in a young orchard, then one or two nearby trees may be destroyed by this gnawing. There seems to be no intent on the part of the woodchuck to consume the bark, for he lets the chips fall where they may. In fact, woodchuck damage may be easily recognized by its raggedness, in comparison with the clean removal of bark by girdling mice or rabbits.

Woodchucks pester the fruit grower in other, more universal, manners. Their burrows may collapse under the weight of heavy equipment--trapping the wheel of the spray rig just when you are about to finish applying second cover. And those gravelly mounds are rough on mowing machine blades after these mounds become semi-hidden in lush grass.

Spring is woodchuck control time. In Massachusetts these rodents should meet their destiny during the period from the middle of April to the middle of May. There are a number of common sense reasons for this. The burrows are easy to locate at this time; the young may not yet have been born or are, at least, still present in the maternal burrow; only a single burrow system is in use at this time of year; and there is less chance of destroying other wildlife.

Gassing is the most practical method of controlling woodchucks in the orchard, and the use of the special Gas Cartridge, manufactured by the U. S. Fish and Wildlife Service, is the most practical means of gassing. Detailed instructions on the employment of the Gas Cartridge will not be given here but are available in printed form from the suppliers of the cartridge, from your County Agricultural Agent, or from our office at the University of Massachusetts.

Cartridges this year can be obtained, under a new distribution system, from a number of cooperators in the state. Chief among these are: Eastern States Farmers' Exchange, Inc.; Farm Bureau Association; Essex County Cooperative Farming Association; and United Cooperative Farmers, Inc.

Gassing with Calcium Cyanide is an alternate method of treating burrow systems. It is best applied with a foot pump, sold commercially for about \$15.00. Used with this equipment, the poisonous fumes are forced into and diffused throughout the underground passages. Depositing a spoonful of Calcium Cyanide in the burrow opening is a slightly less satisfactory method. A zone of gas is formed which is effective only if the 'chuck enters this area before the gas is dissipated.

The use of tractor exhaust, while effective in its action on the woodchucks, is not considered practical in commercial-size orchards. The expenditure of time required by this method precludes its use.

Trapping is a useful adjunct to any gassing program. In a large orchard there may be a few rock heaps or stonewalls that are so loosely piled that the gases are not contained in the burrow in toxic concentration. A No. 2, Coil Spring, Steel Trap is recommended for its high grip and strength, for the woodchuck frequently escapes the jaws of smaller traps. The trap may be set in the trails leading between burrow openings. The woodchuck is quite unconcerned about walking into a trap. Some provision should be made, utilizing sticks, rocks, or natural barriers, to obstruct progress each side of the trap; for the 'chuck will walk around it if that is the easiest thing to do. Traps may be set down in burrow openings if there is fear of catching pets, but frequently this may lead to a fine catch of belly fur.

The necessity of area - wide control cannot be over emphasized. Removal of only a few woodchucks from an orchard sometimes results in the operator becoming discouraged or losing faith in the control practice. It will be found that those woodchucks overlooked in the gassing will reopen the burrows without actually reoccupying them. Thus, it becomes difficult to estimate the efficiency of the control program.

---W. R. Jones

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CHEMICAL THINNING OF APPLES

The 1957 revision of the Chemical Thinning Circular is available. If you desire a copy request Special Circular #189 entitled, "Chemical Thinning of Apples", revised March, 1957 from your County Extension Service or the Mailing Room, University of Massachusetts, Amherst, Mass.

---F. W. Southwick

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THE INFLUENCE OF PREHARVEST DROP CONTROL MATERIALS

ON THE AMOUNT OF INTERNAL BREAKDOWN OF McIntOSH

One of the problems of the 1956-57 storage season was the development of considerable amounts of internal breakdown in many apple varieties. In some late varieties such as Delicious and Spy susceptibility to breakdown was greatly increased by the presence at harvesttime of considerable amounts of water core. Also, temperatures in the high teens and low twenties, prior to picking some late varieties, in mid-October may have frozen some apples and increased their amount of storage breakdown. However, McIntosh which in many instances were picked before temperatures were low enough to freeze the fruit and which showed no signs of water core developed considerable amounts of internal breakdown while in cold storage.

Since most growers are using preharvest drop control materials on their McIntosh some people have wondered what influence they may have had on the development of internal breakdown. In the fall of 1956 experiments comparing the effectiveness of several preharvest drop materials were conducted in two orchards. Samples of fruit from all trees in these experiments were placed in storage at harvesttime.

In March 1957 these samples were removed from storage and left for five days at room temperature. After this period all fruits were cut to determine the percentage of internal breakdown for each preharvest drop control treatment. Since the results obtained were almost identical in both orchards results from only one of them are given in the following table.

The Influence of Several Preharvest Drop Control Materials on the Percentage of Internal Breakdown of McIntosh After 5 Months in Cold Storage

Treatment	Date applied	No. trees	% of internal breakdown after
	1956		5 days at room temperature March 5, 1957
Check		7	16.8
2,4,5-TAA - 20 ppm	9/7	7	18.6
2,4,5-TA - 20 ppm	9/7	7	13.2
2,4,5-TP - 20 ppm	9/7	7	17.9
2,4,5-TA - 20 ppm + NAA - 20 ppm	9/7	7	16.7
NAA - 20 ppm	9/7	7	22.0
- 20 ppm	9/21		
NAA - 20 ppm	9/7	7	25.5
2,4,5-TP - 20 ppm	9/21		

The data show that the single treatments of all the materials used had no influence on the percentage of fruit that had internal breakdown. However, when treatments were applied on both September 7 and 21 to the same trees fruit from these trees developed slightly more internal breakdown than the checks. These data indicate that weather conditions during the 1956 season were largely responsible for the susceptibility of these apples to internal breakdown rather than preharvest drop control materials. Also, the fact that our Cortland trees, which are not subject to preharvest drop and were not sprayed with drop control hormones, produced fruit that developed a considerable amount of internal breakdown, lends support to the previous statement.

---F. W. Southwick

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

MAY 15, 1957

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Contributors to this issue from Supporting Fields

Frederick E. Cole, Extension Marketing Specialist

THE OPPORTUNITY FOR ROADSIDE STANDS

There is just one reason why consumers are buying at roadside stands and farm sales rooms to the extent of an estimated \$20,000,000 annually. They are able to buy what they want for good eating.

Also, there is just one reason why producers sell through a roadside stand or farm sales room. Their net returns are increased by using this selling method with other selling methods.

Basically, the main problem and the big opportunity of these operators is to continue to improve this advantage of providing good eating satisfaction.

The requirements are simple and few: 1) good products - 2) good business methods - 3) helpful sales people - 4) cleanliness - 5) shopping made easy - 6) attractive surroundings.

Sales volume is a reliable guide to your success. If the stand is conducted in a way to cause your customers to tell their neighbors about your products, the main requirements are being met and your business is gaining.

1. There may be some operators who do well because people like to hear them talk, but usually good usable products is what brings the customers to your stand. The products may not all be the most fancy, but they are sold and bought for what they are, and they fit the intended uses. Some better than average eating results from the purchases.
2. Good business methods are also essential. Prices are "on the market" for the quality and the package. Selections are made easy. Satisfaction is guaranteed and a satisfying policy for product return is in use.
3. Pleasant sales people are helpful in making desired selections. Services are given when services are requested. Change is quickly and accurately made. Help is given in getting produce to the car when help is desired.
4. The display areas, sales room, sales people and the area surrounding the sales room are clean. It is food you are selling. Confidence in the wholesomeness of your products is important.
5. It is easy to stop and buy. There is a sign to give warning of your location. The entrance of your sales area is wide enough to make getting off the road easy and safe. A car can be parked on the level with enough space to get out and back into the car with packages. There is room enough to back out, turn around and get safely on to the road again. Adequate lighting makes judgement of quality easier. Plain pricing helps to make buying decisions
6. The stand and its surroundings are attractive. It is a pleasant place to stop. It is a good contact with a pleasant country and a good farm. Customers get a "lift" from making purchases there. There is space to walk around just a bit as a relief from driving.

Not all successful stands have all of these requirements, but no one knows how much more business they would do if they did have them. Some stands are noticeably short on one or more of the requirements, but there is a good chance that some others are excellent to make up at least in part for the obvious deficiencies.

Most of the sales promotion for the stand or sales room has already been mentioned. It starts with the sound planning of the outlet. Paid advertising has the main function of letting people know what you have for sale this week and letting new customers know where you are located. Word of mouth advertising - customer advertising - has prepared the way for the most part.

Your name and address in each package is an implied guarantee and a grade mark, where grades are available, may be used to build customer confidence without which you have little in the way of repeat sales.

The "Approved Farm Stand" sign of the Massachusetts Fruit Growers Association is used by a group of growers who recognize the value of the above requirements for stand operation. They are trying to build sales. The sign is just plain good business for those who are really serious in the development of a roadside stand or farm sales room business. The requirements of the sign are simple and few.

These requirements are being met by some who do not have a sign, but if so, a sign would "tell the world". The more signs used, the more that can be done in advertising.

Roadside stands and farm sales rooms have a future. A sound foundation under the use of this outlet means greater returns over a period of years.

---F. E. Cole

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POMOLOGICAL PARAGRAPHS

Puritan

Several growers during this last month have asked about the Puritan apple variety. Puritan originated from the cross McIntosh x Red Astrachan made by the late Prof. F. C. Sears at the University of Massachusetts about 1929. It is recommended for trial by growers wanting an early red apple. Massachusetts growers who already have fruited the variety report favorably on its size, color, quality and public acceptance at road side stands.

The Puritan is an attractive, well colored red apple of medium size which retains its size well even with a full crop. The quality is good for an early apple although rather tart. The flesh is crisp, white and does not discolor readily. Sauce and pies made from it have a distinct pinkish color. The season of harvest of Puritan is just ahead of Early McIntosh.

The tree of Puritan is hardy, vigorous, with wide crotch angles and has the tendency toward biennial bearing. It will pollinate McIntosh.

---W. J. Lord

SOIL MANAGEMENT OF STRAWBERRIES

Soils on which strawberries are grown continuously without benefit of rotations will become gradually less productive. In such soils, air and water rather than nutrients may be the limiting factor. Strawberries have shallow root systems and therefore need an adequate supply of moisture within 6 - 12 inches of the soil surface. On the other hand, a compact, impervious soil is detrimental to root growth. The soil originally selected by the grower may have met the specification for being a desirable soil for strawberries, but continual cropping with strawberries without rotation soon breaks down the soil structure.

Soil structure is the arrangement of soil particles which are not only individual mechanical elements, such as sand, silt and clay, but also aggregates of smaller mechanical fractions. In order to have a soil that is loose and friable, stable aggregates are necessary. "Aggregation and its accompanying arrangement of structure is the anatomy of the soil. It is only by the virtue of aggregation that air and water can enter and leave the soil." In soils that are continually cultivated, the aggregates are broken down by the various cultural operations and by weathering.

Decomposing organic matter is the source of organic acids that stabilize the soil aggregates. In addition, organic matter (a) serves as a storehouse or supply of plant nutrient elements, (b) is the site of microbiological processes occurring in the soil, (c) is the source of various organic and inorganic acids which dissolve soil minerals and (d) forms humus which possesses many physical and physicochemical properties which make it a valuable soil constituent.

Since the maintenance of a high organic matter level is difficult and expensive, the strawberry grower should try only to maintain organic matter at a level that will result in good yields. Farm manures, sod crops and green manure crops are the materials that most strawberry growers use to increase the supply of soil organic matter. It is the fortunate grower who can get adequate amounts of farm manure for not only is it a source of plant nutrients but the ideal source of humus. If manure can be supplied at the rate of 20 to 40 tons (approximately 10 to 20 cords) per acre probably no green manure or sod crops are necessary. Most growers, however, are not that fortunate and must rely upon green-manure and sod crops in rotations. Which of these the grower will use to supply organic matter to the soil depends upon the amount of land available, the adaptability and utilization of the crops in a rotation and the presence of certain insects and diseases. Generally a long rotation in which strawberries occupy the land only approximately about 16 months out of 5 or 6 years is most satisfactory.

Following are some suggested soil management programs that the strawberry grower may follow.

USE OF GREEN MANURE CROPS ONLY

When no extra land is available the grower must rely on green manure crops to supply humus from the time the old bed is plowed after harvest until strawberry plants are again set the next spring. After the old bed has been thoroughly disked in late June or July, millet, sudan grass or a mixture of the two can be

sown. When preparing the soil for seeding apply 500 to 800 pounds of 10-10-10 or its approximate equivalent per acre.

Rate of Seeding

<u>Soil</u>	<u>Cover Crop</u>	<u>Amount per Acre</u>
Well drained	Sudan grass	25-30 lbs. per acre
Poorly drained	Millet	20-25 lbs. per acre
Average soils	Mixture (sudan & millet)	(20 lbs. sudan per acre (15 lbs. millet per acre

In September the green manure crop can be plowed or disked under and winter rye or wheat, oats or oats with winter rye can be sown. When preparing the soil apply 300 to 500 lbs. of 10-10-10 or its approximate equivalent per acre.

When the soil is to be fumigated do not sow a green manure crop after plowing or disking under the strawberry plants. When preparing the soil apply 300 to 500 lbs. of 10-10-10 or its approximate equivalent to hasten plant decomposition. In addition, the fertilizer will be available for the cover crop that follows. Wait 4 to 6 weeks or whatever time necessary for thorough decomposition of plant parts. It probably will be necessary to work the soil lightly at least once during the period preceding fumigation to eradicate weeds. The fumigant can not reach nematodes protected by undecomposed plant parts.

Some fumigants must be applied while the soil temperature is still above 60°F, other above 50°F, so the soil usually should be fumigated by the last of September. A green manure crop of winter rye or wheat, oats or oats with winter rye can be sown approximately two weeks after fumigation.

Rye over-winters and may be planted up to October 15, depending upon the locality. Sow at the rate of two bushels per acre. The growth made by winter rye in the fall is likely to be small but in the spring growth usually is vigorous. Winter rye plowed under when still young and succulent decomposes rapidly but forms little organic matter. On the other hand, mature winter rye adds more organic matter but decomposes slowly. A quickly available nitrogen-carrying fertilizer should be applied to the mature winter rye before or when it is plowed under to hasten decomposition and to help prevent nitrogen deficiency in the strawberry plants that follow. On light soils, 500 to 800 lbs. of 10-10-10 or its approximate equivalent should be sufficient to hasten decomposition of the winter rye and at the same time supply enough nutrients for the newly set plants.

Growers wishing a green manure crop that winterkills may use barley or oats. If planted by September 1st, in most localities, these should make 8 to 10 inches of growth in the fall and provide sufficient soil cover. Sow at the rate of two bushels per acre. When preparing the soil apply 300 to 500 pounds of 10-10-10 or its approximate equivalent per acre. Although, the oats and barley won't add as much organic matter, they are easier to plow under than a rank growth of winter rye. In addition, there won't be so much vegetative material to be broken down by the micro-organisms which compete with crops for nitrogen.

In case the grower does not get the opportunity to sow a green manure crop until the middle of August or first of September and is not going to fumigate, the following cover crops could be seeded:

- (a) Sow winter wheat or rye at the rate of two bushel per acre then plow-under the crop early in spring.
- (b) Sow oats and winter rye at the rate of two bushels of oats and one bushel of rye per acre then plow-under the crop early in spring. Oats will make quick early growth but there will be less cover crop to plow-under in the spring than in case of (a).

The grower should fertilize all his green manure crops to increase yields and value of the manure crop. Fertilizer should be applied at the rate of 300 to 500 lbs. of 10-10-10 or its approximate equivalent per acre.

ROTATIONS WITH SOD CROPS

A definite rotation which includes sod crops should help maintain an adequate supply of organic matter in soils devoted to strawberry culture. In addition, rotations aid in the control of weeds, insects and diseases. The presence of a cultivated crop in the rotation will give the grower a source of income and at the same time should help rid the soil of white grubs. Potatoes, tomatoes or peppers should not be planted because they may be a source of Verticillium Wilt on the strawberries. Beans, peas, squash, corn etc., on the other hand, would be desirable cultivated crops. Fertilizer should be applied on all crops in the rotation. If clovers are used in the rotation, their lime requirement should be met. The following are two good rotations for the maintenance of organic matter.

Rotation A - When land is to be kept out of strawberries one full year or more a sod crop is preferred being less labor and more beneficial than continually sowing and working under of green manure crops. With the following rotation, land could be kept in sod one, two or three years. If the land is to be in sod only one full year and then replanted to strawberries, the sod can be worked under in the fall previous to replanting. A cover crop of winter rye, winter wheat, oats or oats with winter rye could be sowed. To avoid grub injury to strawberry plants, refer to the material in the Strawberry Pest Control Chart which may be obtained through your County Extension Service or the Mailing Room, University of Massachusetts, Amherst, Massachusetts.

First Year - Strawberries (non-bearing bed)

Second Year - Strawberries (bearing bed)

After disking under plants, sow grass mixture (5 lbs. timothy, 2 lbs. alsike clover and 8 lbs. mammoth red clover) per acre.

Third Year - Sod

It is desirable to cut hay and let lie. Cut hay before it heads.

Fourth Year - Cultivated Crop.

Follow cultivated crop with winter rye, wheat, oats or oats with winter rye.

Fifth Year - Strawberries.

When preparing the seed bed for the grass mixture, work in the fertilizer and then let the soil set 2 or 3 weeks to firm seed bed. This should improve the "catch" of grass when seeded. It may be necessary to work the soil lightly once during the 2 to 3 week period to eradicate weeds. Seed before end of August. Fertilizer should be applied at the rate of 300 to 500 lbs. of 8-16-16 or its equivalent per acre.

Rotation B - This rotation or one similar is particularly desirable for growers wishing to use a cover crop for mulch.

First Year - Strawberries (non-bearing bed)

Second Year - Strawberries (bearing bed)

Disk or plow-under plants, sow millet, sudan grass, or millet and sudan grass.

Disk and sow winter rye in September.

Third Year - Rye planted September of 2nd year may be harvested for mulch.

Disk or plow, sow grass mixture (5lbs. timothy, 2 lbs alsike clover and 8 lbs. mammoth red clover) per acre.

Fourth Year - Sod

Fifth Year - Cultivated crop.

Follow cultivated crop with winter rye, barley, oats, winter wheat, rye or oats and winter rye.

Sixth Year - Strawberries.

The land could be kept in sod an additional year if wanted. For the green manure crops, fertilizer should be applied at the rate of 300 pound of 10-10-10 or its approximate equivalent per acre, while for the grass mixture 300 to 500 lbs. of 8-16-16 is suggested.

---W. J. Lord

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NUTRIENT ELEMENT SPRAYS

The application of nutrients to apple trees in the form of sprays should be considered as a supplemental or temporary measure and not as a regular program of orchard fertilization. It may be desirable under certain conditions to supplement the regular fertilizer program with nutrient sprays.

If the foliage shows signs of insufficient nitrogen and tree vigor is weak, the application of a urea spray will help to correct this condition. However, if urea is applied late in the season, the nitrogen level of the trees may be raised too high and fruit color may be reduced. Urea sprays should not be applied much later than June 15 on bearing trees.

Orchards which have not had adequate lime or have a history of magnesium deficiency will benefit from sprays containing magnesium in the form of epsom salts. Two or three sprays of epsom salts at 20 pounds to the 100 gallons will provide good insurance against magnesium deficiency.

Unless the grower is certain that urea or epsom salts are compatible with the insecticides and fungicides used in his spray program he should not include urea and/or epsom salts in his regular spray mixtures. To be on the safe side all nutrient element sprays should be applied as separate applications.

---W. D. Weeks

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AIR-BLAST SPRAYERS

The annual Sprayer Demonstration sponsored by the Worcester and Middlesex County Extension Services was of great value to growers in attendance. The trouble-shooting session was of particular value in that nozzling of air-blast sprayers was discussed. In addition, the sales representatives of the various sprayer manufacturers discussed the main reasons why some growers are not getting satisfactory performance with their air-blast machines. The representatives of the sprayer manufacturers stressed that any grower not satisfied with his sprayer performance should not hesitate contacting the local sprayer dealer.

The following material pertaining to operation of air-blast sprayers was discussed.

I. Nozzling of Air-Blast Sprayers.

First Step: Determine Ground Speed

- A. A speedometer is very desirable!
- B. The speed of travel to which most machines are best adapted is from 1½ to 2 miles per hour.
- C. If the tractor has no speedometer, the table immediately below gives the equivalent rate in feet per minute and the number of trees which would be passed by.

NO. TREES SPRAYED PER MINUTE AT VARIOUS RATES OF TRAVEL

Miles per Hour	Feet per Minute	Number of Tree Spaces Passed per min. with Trees Spaced at:				
		18'	20'	35'	40'	50'
1.0	88	5.5	4.4	2.5	2.2	1.8
1.5	132	7.3	6.6	3.8	3.3	2.6
2.0	176	9.8	8.8	5.0	4.4	3.5
2.5	220	12.2	11.0	6.3	5.5	4.4
3.0	264	14.8	13.2	7.5	6.6	5.3
4.0	352		17.6		8.8	6.8
No. of trees Per Acre Planted on Square		134	109	35	27	17

D. The following formula also can be used to determine speed of travel.

$$\frac{S \times N}{88} = \text{M.P.H.}$$

M.P.H. - miles per hour

S - tree spacing in feet

N - number of trees passed in one minute.

Example: If trees are spaced 40' apart in the row and the tractor passes 3.3 trees per minute $\frac{40 \times 3.3}{88} = 1.5$ miles per hour

Second Step: X Concentration Desired

- A. When nozzling the air-blast sprayer the grower must decide the X concentration.
- B. If X Concentration is changed during the spray season, nozzling must be changed.

Third Step: Determine the Average Spread of the Trees in the Block to be Sprayed

- A. This should be the average of the medium to medium-large trees in the block rather than an average including the smallest and the very largest trees.

Fourth Step: Based on Average Tree Size (Step 3) Determine the Proper Gallonage of Dilute Spray Normally Applied.

- A. The following table gives the number of gallons necessary to cover trees of different age groups with 1 X dilute spray mixture.

Approximate Tree Age	No. of gals. to cover trees with 1 X dilute mixture
8 - 10	5
10 - 12	10
12 - 15	15
15 - 20	20
over 20	25

Fifth Step: Determine the gallons per minute required to provide the dosage necessary to obtain pest control on the size trees being treated.

- A. In steps 1 through 4 we have determined:
 - a - Average tree spread
 - b - Gallons of dilute spray per tree
 - c - Rate of travel
 - d - Concentration desired
- B. Having the above information use the following formula in order to determine necessary discharge per side of rig:

Rate of Travel (feet per min.)	$\frac{1}{2}$ gals. per tree	Gallons per min. per sprayer
X required dilute	=	side required for that size
X Conc. Desired	X Ave. Tree Spread	tree at the speed.
	in feet.	

For Example:

- a - Rate of travel - 176 feet per min.
- b - Gallons of dilute spray per tree = 15 gals.
- c - Concentration desired = 2 X
- d - Average tree spread = 33 feet

Multiply the rate of travel (176 feet) by one-half the number of gallons of dilute normally used per tree (7.5 gals.). Then multiply the concentration (2 X) by the average tree spread (33 feet). Divide the results of the first multiplication by the result of the second. The resulting figure will be the required rate of deliver in gallons per minute for your air-blast sprayer.

$$\frac{176' \times 7.5 \text{ gals.}}{2 \times 33} = \frac{1320}{66} = 20 \text{ gals./min. per side}$$

Sixth Step: Determine Arrangements of Nozzles on the Sprayer

- A. Number of gallons per minute that must be delivered per side is known.
- B. Then, refer to tables provided by the manufacturer, which gives the capacity in gallons per minute of spray nozzles with different - sized orifices (nozzle disc opening) operated at different pressures.
- C. The vertical spacing of the number of nozzles necessary to supply the required gallonage should provide uniform coverage and dosage. To do this, position the nozzle and arrange nozzle sizes to put two-thirds of the total-output in the top third of the tree and one-third of the discharge in the bottom two thirds of the trees. Remember some nozzles may be plugged entirely or shut off by convenient valves.

Example: Twenty gallons per minute per side is required, therefore 2/3 or 13.3 gallons should be directed at the top third of the tree and 6.7 gallons at the bottom two thirds.

- D. For two-way delivery, nozzle both sides in the same manner.
- E. The manufacturers have manuals which indicate a number of nozzle set-ups to meet certain gallonage requirements. However, because of so many varying conditions - how trees are pruned, kind of tree, spacing, terrain, etc., it is almost impossible to set a definite standard. Because of this the grower should work with the dealer to establish the proper nozzling and spray pattern to conform to the individual orchard condition.

Reasons Why Some Growers Are Not Getting Satisfactory Performance

- 1. Sprayer not nozzled properly.

2. Nozzle wear. (nozzles should be checked three times during the spray season.) Some types of nozzles such as the disc type wear more rapidly than the whirl-mist nozzles. The discs wear and will increase the amount of material applied in addition distortion of spray pattern and distribution will occur. Sprayer manufacturers have guages which can be bought by the grower for checking the disc orifices for wear.

3. A varying speed of travel during spraying.

4. Failure to have deflectors adjusted properly in order to get thorough coverage (must adjust for wind, direction of wind, tree height, etc.)

5. Voids in the spray patterns. (Gaps in the spray pattern so that one part of the tree is receiving insufficient amount of spray.)

---W. J. Lord

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CHANGES IN THE STRAWBERRY INDUSTRY

A recent study on "Trends in the Ohio Strawberry Industry" (Ohio Agr. Expc. Station Research Bul. 787) contains information which may be of interest and value to growers in Massachusetts.

1. Strawberry acreage in the United States has declined from about 208,000 acres in 1928 to about 109,000 acres today, while total production has about doubled in the same period.

2. The national per capita consumption has decreased from 2.5 quarts in 1941 to 1.9 quarts in 1954.

3. Whereas only 10% of the national crop was processed in 1939 over 55% of it was processed 1954.

4. In ten years' time the production in California, Oregon and Washington has risen from 20% to 60% of the national crop. Michigan, New York and New Jersey produce about 9%, 3.4% and 2.5% respectively of the U. S. total.

Where do we stand in Massachusetts?

1. In 20 years our acreage has dropped from 1562 to 461 according to the 1954 census. During the same period our production has gone from somewhat over 3 million quarts to less than 800,000 quarts.

2. Production has decreased considerably in most counties, but the big drop has been chiefly in Barnstable County. Middlesex is now our leading strawberry county with somewhat higher production in 1954 than in 1949.

3. Better growers report yields of 10,000 to 12,000 quarts per acre. We are in a consuming area where people have better than average incomes. Quality local berries properly handled bring satisfactory prices at retail. "Pick your own" is gaining favor as a method of profitably handling the crop with a minimum of headaches on the part of the grower.

---A. P. French

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FRUIT NOTES

JUNE 15, 1957

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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RENAMING OF STRAWBERRY VARIETIES

A recent report from the U. S. D. A. Plant Industry Station, Beltsville, Maryland (in Fruit Varieties and Horticultural Digest of the American Pomological Society) gives the following list of common strawberry varieties from which in their tests certain rather new introductions from nurserymen are indistinguishable.

✓ Armore	indistinguishable	from	Red Cluster
✓ Dunlap	"	"	Parish
✓ Fairfax	"	"	Grandview, Cummerbund
✓ Gem	"	"	Superfection, Brilliant
✓ Howard 17	"	"	Polor Queen, Golden Bell
✓ Midland	"	"	Crimson Flash, Adonis
✓ Robinson	"	"	Scarlet Beauty, Kardinal King
✓ Sparkle	"	"	Paymaster

Our variety trials in Massachusetts agree with their findings on Gem, Robinson and Sparkle and we expect to have two other of these comparisons fruiting this year.

---A. P. French

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"PICK YOUR OWN METHOD" OF SELLING SMALL FRUITS

The "Pick Your Own" method of harvesting small fruits appears to be gaining popularity in Massachusetts. In many instances growers were forced to use this method when it became impossible to obtain pickers. After trying the "Pick Your Own Method" of selling, however, the majority of these growers agree with James Cesan of West Feeding Hills who states, "I would never go back to the old method. I sincerely can say that I am all for 'bring baskets and pick your own strawberries'. Try it!"

Some growers are reluctant about letting the public pick the fruit for fear they will trample many berries. Walter Morss of Bradford states "the public is no harder on our picking beds than a crowd of our own hired pickers. In fact, I think they are better as most people come to pick and not to fool around."

James Cesan formerly hired women and children to harvest about eight acres of strawberries. The headaches were many with such things as frequent fights, berry throwing, messy berries, baskets half full and straw in the bottom of the baskets.

What about honesty on the part of the public? Growers have found the majority of the people honest and that with supervision trouble can be avoided. Richard Sanford of Westfield requires: (a) baskets paid for when purchased; (b) no berries paid for before picking and (c) berries paid for before being put into the car. Mr. Sanford states that this eliminates all bookkeeping and arguments concerning what has been paid for.

A problem cited by several growers is that some people try to get a box and a half of berries in a box. One grower has stated that he feels it might, with

some of the public, become necessary to sell the berries on the basis of weight. To combat this problem, Mr. Atherton Parsons of Southampton has one or two quart baskets on a table, at the entrance to the strawberry planting filled with imitation strawberries made of plaster of Paris and painted red with green caps. These sample baskets are filled to indicate what the grower considers a full quart. In addition, he has the following regulations posted on a bulletin board for customers to read when they enter the field:

Adults only in picking field.
Please be careful to walk only in aisles.
Pick in quart basket only.
Baskets may be purchased here for 2¢ each.
Bring berries to stand for settlement.
See sample basket for fullness.
Heaped baskets 5¢ extra.

Mr. Parsons states that it is the small minority of people who try to get too many berries in their quart baskets.

Growers selling their small fruit on the "pick your own basis" sell baskets to the customers if they have none of their own. Generally, the quart or pint baskets are the only containers allowed in the fields, no pails, kettles, or crates and so forth.

Ample, nearby parking is a must. Also it is essential to have a place where small children can stay and still not be too far away from their parents.

Growers have found it necessary to modify their cultural practices slightly. Richard Sanford states that strawberry row spacing should be wider than usual in order to provide ample walking space for customers. In addition, he believes that raspberry canespacing should be wider to make it easier for the public to find all of the berries.

Growers generally advertise in their local papers when the berries are ready to be harvested. Many compile a mailing list of customers to whom postal card notices are sent when berries are ripe.

It is not necessary to be on the main road to operate successfully the "Pick Your Own" method of selling small fruits. All that is necessary is to give explicit directions in the newspaper advertisement or include a map. The erection of neat and well placed signs to direct the customers to the farm is a necessity.

With the increasing difficulty of getting adequate and reliable labor to pick the small fruit crop, more growers should consider the "Pick Your Own" method of harvesting. Many growers have been able to increase their acreage using this method of selling. If you haven't tried the "Pick Your Own" method of selling of small fruits, give it a try. It can be a very profitable way of harvesting the small fruit crop. Remember, however, it takes patience when you are dealing with the public. In many of the road side stand and "Pick Your Own" selling operations, the wife is your best salesman.

---W. J. Lord

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WHAT IS A VIRUS?

Recently, at a meeting of strawberry growers, strawberry viruses were under discussion. There was a request for a good layman's definition of a virus.

In the U.S.D.A. Yearbook of Agriculture for 1953 the following appears:

"Virus. An infectious agent too small to be seen with a compound microscope".

This is adequate if one is not interested in technicalities. If one is interested in a more precise definition, the same paragraph continues:

"It is not yet settled whether viruses are living organisms, because they have characteristics of both the living and nonliving worlds. The definition that is generally accepted is that they are large, high-molecular-weight protein bodies capable of multiplying and acting like organisms when they are in living tissue."

---J. S. Bailey

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WHY MOW GRASS IN THE ORCHARDS?

In an article published in the American Fruit Grower, Dr. John R. Magness stated that on a hot summer day with low humidity a vigorous 20 to 25 year old apple tree with a large leaf area will use up to 125 gallons of water a day. Under average conditions, however, a large apple tree in our eastern orchards will use about 60 to 70 gallons per day. Using the later figures, an acre of 20 to 25 year old apple trees planted 40' x 40' will use approximately 1600 to 1900 gallons of water a day during the summer months. With these figures in mind, what can a grower do to conserve soil moisture?

A study conducted at the University of New Hampshire Experiment Station showed that the soil moisture loses at 12 inches and 30 inches depth were reduced considerably by mowing the grass in the orchard and letting it lie.

Soil moisture studies made in Michigan orchards (Quarterly Bulletin, Michigan Agr. Exp. Sta., Nov., 1956) showed that permanent sod covers vary considerably in the depth to which they deplete soil moisture. "Kentucky bluegrass, timothy, redbud, and Chewing's fescue grass sods depleted soil moisture the least; they satisfied their needs primarily from the upper 24 inches of soil. These four grasses were similar in both amount and depth of depletion.

The legume sods, white dutch clover, Ladino clover and alfalfa, depleted soil moisture seriously to the lowest measured depth of 40 inches. White dutch clover used somewhat less moisture than Ladino and alfalfa. Ladino clover and alfalfa used moisture about equally to a depth of 40 inches. Quackgrass water usage was intermediate between the grasses and legumes.

Mowing about mid-June conserved soil moisture under the grass sods and the alfalfa sod during early summer of 1952, 1953 and 1954. The moisture-conserving influence of mowing extended into late summer under some grasses and alfalfa in years of low midsummer rainfall.

Abundant soil moisture at the time of mowing or shortly after encouraged more rapid regrowth of the mowed sods, increasing depletion of soil moisture in late summer. During such seasons, repeated mowings of the new growth should continue to reduce water usage.

One mowing in mid-June conserved more moisture during seasons of deficient summer rainfall; regrowth of the mowed sods remained low because of drouthy conditions."

In addition to conserving moisture, mowing reduces the fire hazard, aids in mouse control and makes the harvesting operation easier.

---W. J. Lord

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HOW IS DEPRECIATION ON ORCHARDS HANDLED?

There are three definite periods in the life of a farm or an orchard.

These are (1) the preparatory period, (2) the development period, and (3) the productive period.

In the preparatory period expenditures may not be deducted as farm expense but must be treated as capital expenditures.

Some typical expenditures, which also include material and labor costs and which must be capitalized are the costs of:

1. Clearing brush, trees, and stumps.
2. Leveling and conditioning land.
3. Trees and their planting.
4. Installing drain tile and permanent irrigation.
5. Building roads.

You may claim depreciation on any of the above which are of a depreciable nature. Also, if any of them qualify as a soil or water conservation expenditure, they may qualify for special treatment.

During the development period you may capitalize your expenditures, which are required by current operations or you may deduct them as current expense. Expenditures of a capital nature, may not be deducted at any stage unless they are for soil or water conservation. Some expenditures which you may capitalize or deduct as current expense whichever you prefer, are the cost of the upkeep, taxes, water for irrigation, fertilizer, controlling undergrowth, and cultivating and spraying of trees.

In the productive period when trees are bearing ordinary and necessary expenses cannot be capitalized. When the orchard reaches the productive period these expenses are deducted each year when they are incurred, if you report on the accrual basis, or when they are paid if you report on the cash method.

Depreciation on commercial orchards (investment in trees aside from the bare land) is allowed upon reaching producing age if on a reasonable basis.

If an orchard has been grown by the present owner and the costs deducted on previous income tax returns as annual operating expenses, then depreciation cannot be justified because the costs have already been charged off once.

If a bearing orchard is purchased, the new owner may start taking depreciation on its cost to him.

There are no nationwide or even statewide "official" rates for calculating orchard depreciation. The taxpayer should use his best judgment in estimating the probable length of the productive life of his orchard.

The cost of setting out new orchards should be handled as follows:

1. Amounts spent in setting out new orchards must be treated as capital investments, rather than as current operating expenses.

2. The taxpayer may treat as either capital investment subject to depreciation or as current operating expenses such expenditures during the development period of orchards as those for cultivating spraying and taxes; and most farmers find it more convenient to treat such expenditures as current operating expenses.

---L. D. Rhoades

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POMOLOGICAL PARAGRAPH

Winter Injury to Peach Trees

Peach trees in many orchards in the state are showing considerable dieback at the tips of branches from winter injury. There are some trees completely dead. Many trees only have about 30 to 50 per cent of normal leaf surface.

Growers should not prune peach trees until full extent of the damage has been determined. A hot, dry summer might result in wilting and dying of the new shoots and leaves due to the inability of injured cells to conduct sap from the roots. By the time the amount of the winter injury has been determined, the grower might as well wait until next spring to prune unless he is particularly anxious to prune out the dead wood. If any pruning is done this summer cut out dead wood only. It is vital to save all the leaf surface on these injured peach trees in order that they have the fullest opportunity to make recovery.

---W. J. Lord

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APPLE THINNING

While conducting our chemical thinning tests this spring and looking at heavy sets of fruit in many orchards, a few thoughts have come to mind. If the use of chemicals fails to thin the crop sufficiently, some hand thinning may be necessary. Hand thinning should be done as soon after the June drop as possible. Of course, injured and the smaller fruits should be removed first. If a fruit is smaller than its neighbors in June it will also be smaller in September. The factors which made a young apple relatively small to begin with persist throughout the growing season.

We've noticed several new plantings of Early McIntosh and Puritan which are just coming into bearing. These varieties are very biennial and it might be very much worthwhile to start hand thinning these small young trees in their first bearing year. This job, if done quite early might help to prevent the development of a strong biennial tendency. Although chemical thinning of such young trees might help to prevent the development of a strong biennial cycle it might reduce the crop on such young trees too drastically. Hand thinning of these trees would offer less risk and can be done quite rapidly on small trees. However, the job should be completed by mid-June if the thinning operation is going to influence flower bud formation.

---F. W. Southwick

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N O T I C E

The next issue of Fruit Notes will be a combined July - August issue and will be published August 15.

---Editor

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EXCESSIVE SPRAY RESIDUES CAN BE AVOIDED

As harvest time approaches those who are growing fruit either for sale or home consumption should adjust their pest control programs so as to avoid excessive residue on the fruit when harvested.

Under the Miller Amendment of the Federal Food, Drug and Cosmetic Act limits of tolerance for spray materials have been established and apply to agricultural products which move in interstate commerce.

The amount of tolerance varies depending upon the material and crop on which it is used.

In general, spray materials fall into four groups as follows:

1. Those which have been declared safe and for which no tolerance is specified such as sulfur.

2. Those which are exempt when used in accordance with good agricultural practices such as Bordeaux mixture.
3. Those for which a zero tolerance has been established such as T.E.P.P. In other words, no trace of these materials is allowed on the fruit.
4. Those for which a tolerance has been established. For apples the tolerance for materials commonly used falls within the range of 0.25 parts per million for aldrin and dieldrin to 20 parts per million for captan.

While no practical means is available to the fruit grower to determine the amount of residue remaining on his fruit at harvest time, he can be reasonably sure that his fruit does not exceed the tolerance if he follows explicitly the instructions on spray material containers and those prescribed in official spray charts.

--- O. C. Roberts

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TRANSFER OF RED STELE TO STRAWBERRY LAND

It has been recognized for some time that soil with no red stele history may become contaminated through drainage water from an infected field at higher elevation. Recently Michigan has reported two other sources of contamination which might not occur to most growers: (1) plants of red stele resistant varieties grown in infected soil may carry red stele spores in soil particles adhering to their roots, and (2) the fine rootlets of some red stele resistant varieties may be attacked by red stele and thereby carry the disease to clean land if such plants are used for starting a new bed.

---A. P. French

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REPEAT BLOOM

In one block of McIntosh apple trees in the University orchard a high percentage of spurs that bore fruit in 1956 bloomed again this year. Last fall the writer tagged on each of 5 McIntosh trees 25 spurs bearing one apple and 12 spurs bearing two apples. In addition, 25 non-bearing fruit spurs were tagged on each tree. The table below shows the tree yields in 1955 and 1956 and the percent of repeat bloom on spurs bearing in 1956.

Tree	Yield 1955	Yield 1956	One Apple	<u>Bloom in 1957 on Spurs Bearing in 1956:</u>	
				Percent Repeat	
				Two Apples	No Apples
1	38.7	16.1	56	38	73
2	44.5	11.7	80	86	92
3	34.6	19.7	55	44	96
4	34.6	18.1	81	83	100
5	26.6	15.3	53	70	70

Undoubtedly, some of the reasons for such a high percentage of repeat bloom of spurs bearing in 1956 were the light crop in 1955 and conditions favorable for flower bud development.

With many varieties, the same spur often bears fruit only every other year or may go two or three years without bearing. However, if the blossoms fail to set because of frost, lack of pollination, low vigor of the tree, or if the blossoms are intentionally removed these spurs may blossom again the next year. Spurs on annual bearing varieties such as Cortland and McIntosh are more apt to bloom in successive years than those on varieties like Baldwin and Early McIntosh which are biennial.

---W. J. Lord

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THINKING ABOUT C.A. APPLE STORAGE CONSTRUCTION?

HERE'S WHAT TO CONSIDER.

Controlled atmosphere (C.A.) storage construction is complex. If improperly carried out, serious operational problems may result. Careful planning, quality materials, and good workmanship will produce satisfactory results. Here's what to consider in planning.

Space Requirements - Space must be provided for the crop; grading and packing; equipment, including the refrigeration compressor, the carbon dioxide scrubber, and the breather bag; a loading ramp, and in some cases sales. The amount of space allotted to each of the above will depend on the total capacity of the storage and how it is tied into the remainder of the regular refrigerated fruit storage. In making allowance for storage space, use 2.5 cubic feet per box of apples. This figure includes space for duct work and proper stacking away from walls, ceiling and floor.

Refrigeration - In order to secure the maximum storage life of the apple with C.A., each individual room should be loaded in approximately 10 days. This will determine the minimum daily loading rate. Refrigeration capacity must be enough to accommodate this daily apple cooling load; the cooling load due to the heat of respiration of the apples already stored; the cooling load due to the heat transmitted through the insulated walls, ceiling, and floor; and the cooling load due to the individuals working in the storage, the light, motors, and infiltration through the door. Electrical power for compressor motors larger than 7 hp. should preferably be 3 phase. If water is available in abundance and cheap, a water cooled condenser is recommended. If water is scarce and the tonnage of the unit is over 5, then an evaporative condenser should be used. In rare cases only, should appreciable tonnage be installed using small air cooled condensers mounted directly with the compressor. In such cases, if water is so scarce as to rule out an evaporative condenser, then a remote air

cooled condenser would be justifiable. It should be remembered that air cooled condensers usually are accomplished by higher condensing temperatures which in turn result in less efficiency from the compressor.

Insulation - (Refer to Fig. 1) Established practice has called for the use of 4" of cork or its equivalent ($U = .075$) in the walls, 2" of cork or its equivalent ($U = .15$) in the floor, and 6" of cork or its equivalent ($U = .05$) in the ceiling. Less insulation means the heat transmission through the building from the outside will be greater and refrigeration requirement will then be higher.

Vapor Barriers - (Refer to Fig. 1) On the walls, adequate vapor barriers (less than 1 gr. of moisture per square foot per hour) should be placed on the outside face of the insulation. This will keep moisture from condensing on the cold face of the insulation since it will not be able to penetrate through the vapor barrier on all sides. Ceiling insulation on gable roof storage construction calls for a vapor barrier on the underside of the insulation. The top side requires no vapor barrier provided the space above the insulation is vented.

Gas Seal - (refer to Fig.1) Various materials have been used as gas seals satisfactorily. On the walls and ceiling, the gas seal is placed on the inner face of the insulation. If the material used for the seal requires support, this must be properly anchored through the insulation, to the storage walls. In the floor, the seal is placed over the insulation and under the floor wearing surface.

Special C. A. Equipment - To complete the equipment necessary to operate a C. A. storage, a carbon dioxide scrubber, a breather bag, an Orsat analyzer, and an air purifier must be provided.

If the above components are properly planned and good workmanship and materials used in the construction, your C. A. storage will give you years of satisfactory service.

---J. W. Zahradnik

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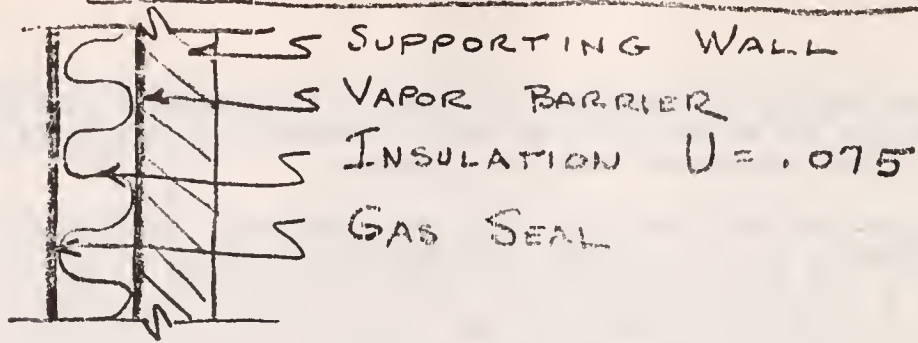
DATES WORTH NOTING

June 17 - Annual Strawberry Twilight Meeting at the University of Massachusetts
7:00 P.M.

July 18 - Summer Meeting Massachusetts Fruit Growers' Association, Rice Fruit
Farm, Wilbraham - all day.

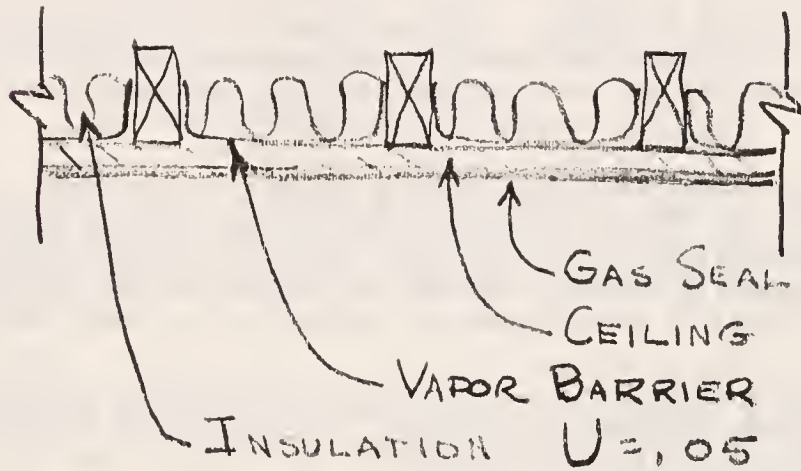
TYPICAL SECTIONS FOR GAS STORAGE

TYPICAL WALL SECTION



TYPICAL CEILING SECTION

(FOR GABLE ROOF)



TYPICAL FLOOR SECTION

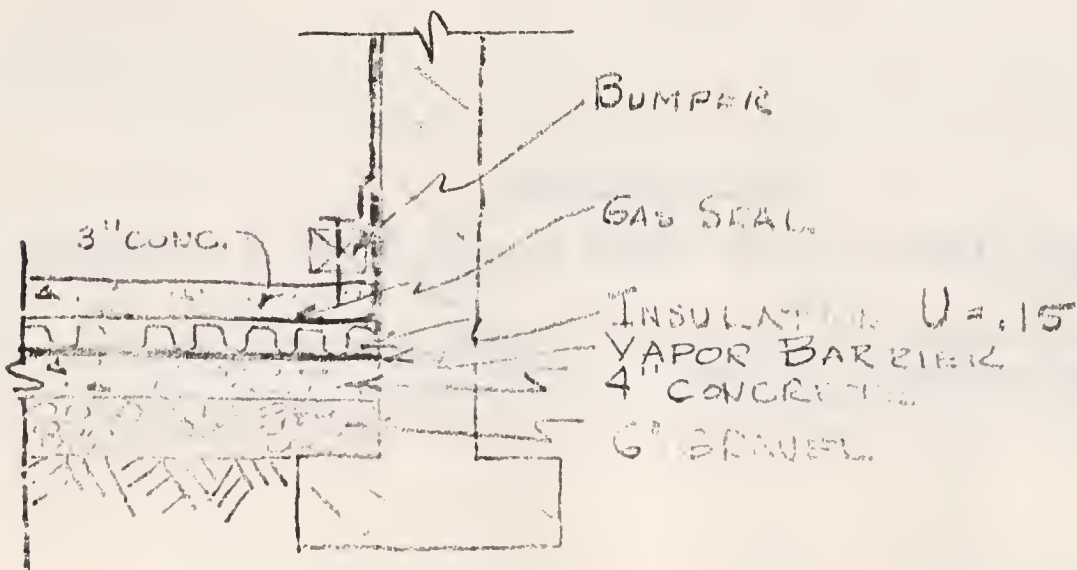


FIG. 1

J.W. ZAHRADNIK
4/9/57 UOPM

FRUIT NOTES

JULY-AUGUST 1957

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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Lord, William J. - Extension Fruit Specialist

Chiefly connected with fruit growers' problems, other than pest control, and is somewhat involved in research. Editor of FRUIT NOTES.

Roberts, Oliver C. - Associate Professor

Teacher of pest control, fruit marketing and other departmental courses. Currently also doing research on fruit marketing.

Southwick, Franklin W. - Professor, Research

Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also teaches in certain advanced courses.

Weeks, Walter D. - Assistant Professor, Research

Active on research in nutrition, root stocks, variety and strain tests and winter hardiness. Also, teaches certain advanced courses.

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Ellsworth H. Wheeler, Extension Entomologist

ABUSIVE HANDLING OF McINTOSH APPLES

Everyone who handles McIntosh apples from grower to retailer knows that McIntosh is a tender variety and is easily bruised, cut and stem punctured.

To determine the extent and source of mechanical injury (bruises, cuts and stem punctures) affecting Massachusetts McIntosh has been the purpose of a series of studies over the past three years. In 1954-55 a study was made in retail stores and it was found that 67 per cent of the McIntosh on display were below fancy grade and that 83 per cent of these were below fancy because of mechanical injury. In 1955-56 a study was made in several packing houses to determine the nature and extent of blemishes on McIntosh in the packages as packed for market. This study showed that 29 per cent of the apples were below fancy grade and that 61 per cent of these were below fancy because of mechanical injury.

During the fall and early winter of 1956-57 another study was made in nineteen packing houses in an endeavor to learn where this excessive mechanical injury is taking place.

In this study a sample of 400 to 500 apples was obtained as the apples came to the packers from storage. These apples were analyzed for number of small bruises (less than $\frac{1}{2}$ "), number of bruises $\frac{1}{2}$ " to $\frac{3}{4}$ ", $\frac{3}{4}$ " to 1" and 1" and over, also for number of cuts and stem punctures. Another sample of 300 to 400 apples was obtained from packages packed for market and analyzed in the same manner.

At eleven of the packing houses studied the apples were hand graded while in the other eight the apples went over some type of grading belt or machine.

The situation with respect to mechanical injury as found in the several packing houses is shown in part in the accompanying table.

In this table columns marked "B" refer to apples as they came from storage to the packers. Columns marked "A" refer to apples that were packed for market.

Column I shows the percentage of apples with few small bruises (less than $\frac{1}{2}$ inch in diameter). Column II shows the percentage of apples with many small bruises (more than 7 bruises less than $\frac{1}{2}$ " in diameter). Column III shows the percentage of apples with bruises $\frac{1}{2}$ " or over. Column IV shows the number of $\frac{1}{2}$ " to $\frac{3}{4}$ " bruises per apple on the basis of all apples in the sample. While a record was made of bruises larger than $\frac{3}{4}$ " the number was relatively unimportant. Column V shows the number of cuts and stem punctures per apple.

One or more of three types of packages were used in the various packing houses: cell carton, polyethylene bag and the eastern apple box commonly known as the crate. A study was made of the extent of bruising and cuts and stem punctures in each type of package. Also, a study was made of the relative effect on mechanical injury of machine grading versus hand grading.

What does this study indicate?

1. That McIntosh apples can be handled with a minimum of mechanical injuries even in orchards with a large volume.

2. That more mechanical injury occurred before grading with growers who use grading machines than with those who hand grade.
3. That excessive bruising is not necessarily the fault of the grading machine but rather how it is used.
4. That in ten out of fifteen cases there was a higher percentage of bruised apples in cell cartons after packing than in a similar lot of apples before packing. This may be due to packers trying to force apples that are too large into the cells.
5. That bruising in polyethylene bags was slightly less than in cartons.
6. That bruising in the crate was considerably more than in the other two types of packages.
7. That the bruising in the crate occurs chiefly in the lidding process.
8. That there was no appreciable increase in cuts and punctures with apples packed in cartons compared with those in a similar lot before packing.
9. That there was a greater increase in cuts and punctures than bruises in polyethylene bags.
10. That there were more cuts and punctures in crates than with the other two types of packages but less increase in cuts and punctures than in bruises. when lidding.

What does this all mean in dollars and cents?

Assuming that each grower included in this study had a 10,000 bushel crop and that Fancy McIntosh were selling for \$3.75 per bushel and utility at \$2.00 (the prices quoted on the Boston Market Dec. 11, 1956), the average loss from bruising alone on apples as they came from storage would amount to approximately \$3,000.00. The least loss would have been \$350. and the greatest \$9,500. There is some indication from this study that much of this loss occurs in the harvesting procedure

How much are you losing from inadequate supervision and inspection when the apples are being harvested?

Packing House Study 1956-57

Orchard	I		II		III		IV		V	
	% apples few small bruises		% apples many small bruises		% apples with bruises $\frac{1}{2}$ " & over		# bruises per apple $\frac{1}{2}$ " - $\frac{3}{4}$ "		# of cuts & stem punctures per apple	
	B	A	B	A	B	A	B	A	B	A
1	45	47	4	5	11	11	.107	.103	.053	.065
2	56	66	10	16	20	37	.230	.480	.035	.016
3	44	45	4	1	21	15	.225	.153	.063	.143
4	39	42	3	5	16	18	.170	.220	.033	.057
5	39	56	7	10	16	15	.225	.173	.030	.037
6	46	47	5	21	19	35	.385	.443	.058	.108
7	38	12	1	1	9	12	.100	.137	.033	.023
8	53	50	14	12	25	13	.315	.170	.043	.017
9	51	46	10	7	19	12	.215	.135	.065	.088
10	52	52	33	34	44	46	.603	.670	.038	.157
11	45	52	15	18	36	31	.460	.460	.060	.223
12	34	40	6	35	28	44	.323	.660	.110	.113
13	53	50	2	11	19	22	.225	.320	.058	.126
14	59	59	8	5	26	28	.282	.297	.084	.133
15	51	67	10	13	25	49	.338	.655	.038	.075
16	35	40	3	2	17	21	.208	.300	.055	.040
17	63	61	11	7	19	15	.218	.133	.036	.080
18	61	60	12	16	22	29	.456	.323	.102	.174
19	33	43	2	4	21	23	.235	.260	.043	.070
Average	47	49	8	12	22	25	.280	.321	.055	.092

---O. C. Roberts

N O T E

Special Circular No. 254 "Preharvest Drop Control of Apples" has been revised and is now available from your local county agent or the Mailing Room, University of Massachusetts, Amherst.

---Editor

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ARE YOU READY FOR HARVEST?

Do you have your supply of Special Circulars #245 and #246?

Special Circular #246 titled "Be A Better Apple Picker" should be read by all your apple pickers and can be used as a guide when your foreman shows inexperienced pickers how to pick properly and avoid bruising.

The foreman of the picking crew has the responsibility of supervising the harvest operation in order that fruit gets from the tree to the storage with the minimum of bruising. Special Circular #245 titled "Harvesting Suggestions for Orchard Foremen" lists suggested harvesting pointers that should be shown and told to pickers.

Copies of the two Special Circulars mentioned above may be obtained through your County Extension Service or the Mailing Room, University of Massachusetts, Amherst.

Have you, the owner, made the necessary preparations for harvest?

1. Inventoried all harvesting equipment.
2. Repaired harvesting equipment.
3. Provided for good harvesting supervision.
4. Provided adequate toilet facilities.
5. Made provisions for supply cool and conveniently located drinking water.
6. Analysed the proposed methods of handling the apples from tree to storage in order to increase efficiency and storage life of the fruit.

The results of the Packing House Survey conducted during the winter of 1955-1956 showed that mechanical injury amounted to 61 per cent of the total cause of apples being below the grade of U.S.Fancy.

Considerable mechanical injury occurs during the harvesting operation. One way to minimize this is to make pickers quality conscious.

1. Be prepared to pay a bonus to pickers who keep damage to the fruit at a minimum.
2. Hire one of your best packers to inspect random boxes of the pickers' fruit.
3. Set up a score card for pickers and post their scores so they can compare ratings with the other pickers.

Have you tested your packing house equipment?

How good is your grading and packing equipment? Is your equipment causing considerable bruising? Here's how you can find out: Select several boxes of unbruised McIntosh apples. Run these apples over your equipment, then count every bruise or dent. Is there an excessive amount of bruises; if so where did the bruises occur?

1. Dumping apples onto receiving belt of the grader.
2. In the apple brusher - cleaner brushes and buffer clothes may be covered with wax which accumulates dirt that bruises or cuts the apples.
3. Fruit rolling down an incline and striking a sharp, unpadded corner of the grader.
4. During a change in elevation such as when the apples roll from the sorter onto the sizing chain of a chain sizing unit.
5. When the apples are spun into a rotary bin by the rubber-tube ejector unit of the revolving wheel grader.
6. When the fruit is transferred to a unit moving at a much different rate of speed.

---William J. Lord

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C. A. STORAGE SCHOOL

A C.A. Storage School will be held Thursday, August 22 at the University of Massachusetts. The morning program to be held at French Hall (10 a.m. to 12 a.m.) will be devoted to instruction in the use of the gas analyzer. The afternoon program (1 p.m. to 3:30 p.m.) is to be held at Atkins Storage in South Amherst. The afternoon will be devoted to the discussion and demonstration of methods used to determine gas tightness of C.A. Rooms. Also, carbon dioxide scrubber and breather bag operation and any other subjects of interest will be considered. Present and future C.A. Storage Operators and others who may be interested are welcome to attend

--- Editor

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PREHARVEST DROP CONTROL

It is now evident, barring a major catastrophe, that a very large crop of apples is to be harvested in Massachusetts. You recall that with a similar crop in 1955 an exceedingly heavy preharvest drop was experienced.

McIntosh. In August of 1955 we had considerable faith in 2,4,5-trichlorophenoxyacetic acid (2,4,5-TA) for preharvest drop control of McIntosh, but by mid-September much of our faith in it was lost. The reason for the failure of 2,4,5-TA to control drop in 1955, when both naphthaleneacetic acid (NAA) and 2,4,5-trichlorophenoxypropionic (2,4,5-TP) were effective, is still not definitely known. In 1956 we tested 2,4,5-TA again in hopes of determining whether this material would be as effective as it appeared to be prior to 1955. However, the 1956 season was not a good year to test preharvest drop control materials. Because of a cool growing season, last year's harvest period for McIntosh was 7 to 10 days later than usual in most sections and no serious fruit drop developed on McIntosh until late September or early October. Under these conditions 2,4,5-TA reduced fruit drop about 50 percent. Even so both NAA (2 applications) and 2,4,5-TP were slightly superior to 2,4,5-TA in this regard.

If McIntosh fruit drop is no more serious in 1957 than in 1956, then 2,4,5-TA would probably be a suitable material. It controls fruit drop for 3 to 4 weeks when effective and does not hasten fruit ripening to a marked degree. It is our guess, however, that McIntosh fruit drop will be more of a problem in 1957 than it was in 1956.

Since 2,4,5-TA appears to lack the reliability of NAA we believe that 20 ppm of NAA is generally the best material to suggest for McIntosh drop control in 1957. For drop control beyond 10 to 12 days, growers will have to apply NAA at least twice at 7 to 10 day intervals. For those who wish to try 20 ppm of 2,4,5-TA in hopes that a single application of it will be satisfactory, we suggest that you watch fruit drop very carefully following its use. If drop control is not evident 5 to 6 days after its application, NAA should be applied immediately. 2,4,5-TP is not recommended for drop control of McIntosh unless they are picked within 2 weeks after it is applied, because of its strong tendency to hasten fruit ripening.

Early Apples. NAA materials are generally satisfactory for drop control of early apples. 2,4,5-TP has a strong tendency to increase the rate of fruit ripening. In some cases it may hasten the development of red color but sometimes the influence on ripening is so pronounced that the fruit may become too soft for sale. 2,4,5-TA does not appear to be reliable for drop control of early apples.

Late Apples. For drop control of late apples (Baldwin, N. Spy, Delicious, and Rome) 20 ppm of 2,4,5-TP is outstanding. It will often control fruit drop for about 4 weeks after the time of application and generally it doesn't hasten the rate of fruit ripening of these late varieties appreciably. Be sure to get this material on the trees while the foliage is in a good healthy condition. If foliage is injured by a frost after this material is applied, good drop control will be obtained. On the other hand, if the foliage has been injured by frost, mites, or magnesium or potassium deficiencies prior to a hormone application, any material may be completely ineffective.

---F. W. Southwick

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PERSONAL LIABILITY INSURANCE FOR FARMERS

A farmer runs a greater risk now than ever before of becoming involved in a lawsuit because of injury or death to another person or of damage to property. More people come to the farm for various reasons, farmers own more power equipment of one kind or another, more skill is required of employees and in some cases more farm processing of farm products is done. Farmer's net worth has increased so farmers tend to lose more if called into court. A substantial court judgement could mean the loss of lifetime savings. Liability insurance is more necessary now to a farmer than ever before.

Personal Liability of Farmers

As an owner or occupier of property, a farmer must maintain his holdings with due regard to the safety of others both as to their persons and their property. This duty applied particularly to the upkeep of buildings and the farm surroundings, in the control of livestock on the farm, in the wholesomeness of the products he sells, as well as to the work undertaken by him both on and off the farm.

Among other things under personal liability a farmer is responsible for the following:

1. To safeguard visitors and their property on his premises. (His highest responsibility is to those persons he directly or indirectly invites to his place; he is less responsible for licensees such as salesmen and he owes trespassers at least the duty of not knowingly harming them.)
2. To keep his livestock off highways where they may cause accidents resulting in injury to motorists or to property.
3. To provide safeguards in handling vicious animals.
4. To warn his tenant of any hazard on the premises that would not ordinarily be detected.
5. To prevent fire from spreading from his property to the premises of another.
6. For his own negligence if an employee is injured while at work.
7. To his own employees, and under certain circumstances, those of a contractor doing work on his farm, even though the contractor might carry insurance.
8. To the public for wholesomeness of his products. (Farmers who sell farm prepared food products such as ready-to-cook poultry, frozen chicken pies, pastries, apple cider, farm made sausage and the like may assume this liability as a result.)

Insurance is offered to protect farmers from some or all of these risks and others not listed.

In general two policies are used:

1. In the case of smaller farmers who do no farm processing and who sell their own products, satisfactory coverage may be obtained by buying a Farmers Comprehensive Personal Liability Policy and securing suitable endorsements under the policy. It should be noted that this policy does not insure any automobile liability away from the premises nor does it insure farm employees unless an endorsement is secured as part of the policy to insure them.

2. In the case of larger farms, insurance for the various risks listed above plus many others can be secured by a Comprehensive General Liability Policy. Farmers who process farm products for themselves and others, who retail milk, make sausage, dress and freeze poultry, make chicken pies, and the like, should consider discussing their farm operations with their insurance agent concerning proper coverage.

It is important in buying insurance that you tell your insurance agent about your farm operations and the various operations you perform both on and off the farm so that he can determine the proper policy to protect you and your investment and equity. If you do not do this your agent would be very easily misled as to kind of business you conduct and hence sell you a policy that does not provide the protection you need. Be particularly careful to check with your agent if you change your farm operations; for example, if you decide to sell on a retail route or open a store off the farm, or decide to start a crop spraying business or do custom work off the farm or grading or packing or storing of other farmer's products on your farm, these operations may not be covered and may make your policy invalid.

The rates you pay will depend on the policy, the risks, the amount of coverage and in some cases the size of your farm.

If you do not carry Workmen's Compensation Insurance on your farm employees you may want to have an employees endorsement added to your present liability policy or to the policy you buy.

---L. D. Rhoades

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FLY CONTROL at the Roadside Stand and Cider Mill

Make your stand, salesroom or mill more attractive to customers by making them less attractive to flies. These suggestions may help you. None will give the desired results unless number one is considered all-important.

1. CLEAN UP AND KEEP CLEAN!

Flies are attracted to moisture -- especially juices from fruits; vegetables, milk, eggs, and meats. Fruit pomace and any decaying fruit, vegetable or meat scraps are attractive to flies. Even small amounts, if moist, may be a breeding ground for more flies.

Provide tight containers with tight covers such as galvanized cans for wastes. Stand them on a hard, easily cleaned surface. Empty waste containers and clean them every day. Bury or burn the wastes immediately -- flies travel farther than you may think possible.

Clean out and remove empty boxes, baskets, cartons, etc. Store them as far from the stand or mill as possible. A dump out back may be out of sight, but the flies it attracts and breeds will be out front in full view.

2. USE RESIDUAL INSECTICIDES ON SURFACES!

Apply residual materials to all surfaces in and around the stand, sales-room or mill on which flies commonly rest. AVOID contamination of edible products and follow directions exactly to get the best results.

Wettable powders leave a visible deposit; emulsifiable concentrates diluted with water do not; oil solutions are not diluted and leave no visible deposit.

DDT is still effective against many flies, including the tiny fruit or vinegar flies; methoxychlor is similar and preferred inside the stand or mill. Diazinon may be used as directed on labels as a residual treatment to wall and other fly-resting surfaces inside and outside the stand or mill. Outside surfaces and dumps may be treated with chlordane, Diazinon, or malathion, the latter two being effective against flies immune to the other materials. Malathion is safe and effective, but has a short residual life. Both Diazinon and malathion are more effective if sugar is added to them as directed on labels.

3. BAITS SUPPLEMENT other MEASURES!

Dry baits containing malathion, Diazinon, and Dipteryx are available under many brand names. Use them sparingly, but frequently, on all horizontal, dry surfaces in or around the stand or mill where flies tend to gather. Liquid or spray baits are described on Diazinon and malathion labels. They can be very helpful where over-all residual spraying is not desirable.

4. SPACE TREATMENTS ESSENTIAL TOO!

Stands and mills that can be closed up completely or enough to prevent cross ventilation may be "space treated" with a finely atomized spray or aerosol. All flies then in the building should be killed by the treatment; there is no residual effect.

Apply space treatments at closing time and at other times as operations permit and the number of flies make it desirable.

Pyrethrin or allethrin, each synergized by materials like piperonyl butoxide, sulfoxide or others, are the chief killing agents. Some products contain methoxychlor or other materials. Products containing DDT, chlordane or similar materials should not be used unless edible foods are covered.

Apply space treatments by using oil based pyrethrin or allethrin "fly sprays" in hand or electrically operated atomizers or by using aerosol bombs. Large (5-lb) bombs are less expensive than smaller types if used according to directions. Otherwise the smaller types may be just as convenient and no more costly.

Read the list of "active ingredients" to get what you want. Follow "directions for use" to do the best job safely.

5. FANS HELP

Fans that direct a current of air across displays may help greatly to keep flies off those products especially attractive to them. Air currents directed out of doorways from inside and above will reduce the numbers of flies which enter.

--- E. H. Wheeler

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FRUIT NOTES

SEPTEMBER 15, 1957

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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What is a Fruit Tree Worth?

A Device for Cutting Apples Into Cubes for
Use As Mouse Bait



Issued by the Cooperative Extension Service, James W. Dayton, Associate Dean and Director,
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States Department of Agriculture and County Extension Services Cooperating.

Publication Approved by George J. Cronin, State Purchasing Agent, No. 19.

YOUR POMOLOGY DEPARTMENT

Anderson, James - Instructor

Teaches courses in general Pomology, small fruit culture and systematic Pomology.

Bailey, John S. - Associate Professor, Research - Stationed at East Wareham.

Doing research on strawberries, blueberries and beach plums. Mr. Bailey also does considerable Extension work with small fruit growers.

French, Arthur P. - Head of Department

Does some teaching in Pomology and in Plant Breeding, active in small fruit variety testing.

Lord, William J. - Extension Fruit Specialist

Chiefly connected with fruit growers' problems, other than pest control, and is somewhat involved in research. Editor of FRUIT NOTES.

Roberts, Oliver C. - Associate Professor

Teacher of pest control, fruit marketing and other departmental courses. Currently also doing research on fruit marketing.

Southwick, Franklin W. - Professor, Research

Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also teaches in certain advanced courses.

Weeks, Walter D. - Assistant Professor, Research

Active on research in nutrition, root stocks, variety and strain tests and winter hardiness. Also, teaches certain advanced courses.

Contributors to this issue from Supporting Fields

E. J. Rasmussen, Extension Horticulturalist, University of New Hampshire

G. W. Westcott, Professor of Agricultural Economics

E. H. Wheeler, Extension Entomologist

APPLE TREE SURVEY REVEALS TRENDS

Points Up Opportunities for the Future

More apples, fewer trees, and fewer but larger orchards -- that sums up the drastic changes that have taken place within the Massachusetts apple industry during the past 30 years, as revealed by a series of three apple orchard surveys taken in 1925, 1940, and 1956. Of course, these trends were evident without surveys, nevertheless the last survey taken by fruit growers under the sponsorship of the Massachusetts Fruit Growers' Association and now being summarized by Oliver C. Roberts and George W. Westcott of the Extension Service of the University of Massachusetts, does throw a lot of light on precisely what is happening within the industry. This information will enable the leaders of the industry to plan with greater wisdom for the future.

Since 1925, the number of fruit growers with 100 or more apple trees used for commercial purposes has declined from 1754 to 371. Slightly over one fifth still remain. And apple trees have decreased from almost a million (984,564) to about one third of former numbers (344,335). This means that the average size of orchard has increased from 560 to almost 930 trees.

To the average onlooker this appears to be a dire situation. There is common talk about fruit growing as a decadent industry. Even some fruit growers tend to depreciate their own industry. This is understandable. Four fifths of the orchards of 1925 have gone out of business. Obviously their operators could not compete. They could not keep up with fast changing techniques in production and marketing. For them the situation was black. But that is only part of the story.

Today, 371 apple growers are producing, on the average, almost 2.6 million bushels annually as compared to 2.1 million bushels produced annually 25 years ago by five times more growers with three times more trees! Apple production in southern New England is on the increase. With increasing production an industry cannot be described as decadent.

New England is the only region in the United States where apple production is on the increase. This bears out contentions held by many over the years -- that southern New England does have the advantages necessary to support a sound apple industry -- natural conditions and unexcelled nearby markets. Combine these with know-how equal to or better than that of our competitors and we have what we have -- a healthy prosperous growing industry.

It is, of course, true that the industry is undergoing change -- drastic change -- and unless we can understand the nature of these changes, we tend to become confused. We are apt to think only of the smaller less efficient operators with marginal orchards on poor sites who are falling by the way side,* and forget those efficient operators who are increasing the size of their operations, their yields per tree, and the quality of their product which in total is larger today than ever before.

The informational analysis now being prepared from these surveys should help us to see our industry in its true light. It should help us to realize

* See Mr. Roberts' article in these Notes on "Causes of Orchard Abandonment."

potentials and opportunities and give us courage to continue to develop the policies and programs, including most importantly research and training, needed to keep our industry prosperous and progressive if we are to forge ahead. Research and training are emphasized because without more know-how than our competitors, whether they be apple growers in other regions or producers of competing products, and without trained and enthusiastic young people, we cannot continue to go forward. The only other direction to go would be to slip backward.

Competition in know-how and trained personnel is sharp. It is a case of having to run hard to keep from falling behind -- but that is true of the competitive economic system we cherish. Fortunately for the apple industry of Massachusetts, it has a potentially bright future. But it will not come to pass by default. The situation calls for continued concerted action on the part of all. Analytical information, now being processed, on such factors as varieties, age of trees, size of orchards, percent of income from fruit, methods of sale, and trends broken down to the individual counties and towns will be invaluable for the industry's leaders in determining goals, policies, plans, and programs for the future.

---G. W. Westcott

FARMS WITH 100 OR MORE APPLE TREES
IN MASSACHUSETTS
By Counties, 1925, 1940, and 1956

County	1925	1940	1956	
			Number	% of 1940
Worcester		276	93	33.7
Middlesex		626	79	12.6
Hampshire		75	32	42.6
Franklin		201	31	15.4
Hampden		87	49	56.3
Essex		133	31	23.3
Bristol		35	19	54.2
Norfolk		58	17	29.3
Berkshire		39	10	25.6
Plymouth		38	8	21.1
Barnstable		8	2	25.0
Total	1754	1576	371	23.7

APPLE TREES IN MASSACHUSETTS

By Counties, 1925, 1940 and 1956

County	Non-Bearing Trees (9 Years Old and Under)						Bearing Trees (10 Years Old and Over)						Total Trees			
	1925			1940			1956			1925			1956			
	Number	% of Total		Number	% of Total		Number	% of Total		Number	% of Total		Number	% of Total		
Worcester	142,510	57.3		38,969	16.1		20,885	18.5		105,872	203,213		248,382	112,780	46.5	
Middlesex	168,663	48.1		46,522	14.5		16,257	15.8		181,414	274,569		350,077	102,745	31.9	
Hampshire	31,005	38.4		15,344	20.5		4,436	14.0		49,568	59,492		80,573	31,744	42.4	
Franklin	35,493	32.8		14,846	14.0		4,260	15.3		72,589	88,344		108,082	27,773	26.9	
Hampden	10,323	33.5		12,487	28.8		5,586	22.0		20,454	30,738		30,777	25,355	58.6	
Essex	22,793	34.0		8,908	13.6		2,066	12.1		44,110	56,354		66,903	17,031	26.0	
Bristol	9,720	42.8		3,356	18.3		1,363	14.9		12,971	14,968		22,691	9,138	49.9	
Norfolk	12,252	47.0		5,653	20.4		805	9.5		13,808	22,027		26,060	8,476	30.6	
Berkshire	13,494	61.1		4,056	15.0		1,165	19.2		8,564	22,963		22,058	6,054	22.4	
Plymouth	12,160	51.6		2,569	9.7		443	16.9		11,361	23,921		23,521	2,620	9.9	
Barnstable	3,468	63.7		805	19.6		129	20.1		1,972	3,294		5,440	639	15.6	
Total	461,881	46.9		153,515	16.1		57,395	16.7		522,683	799,883		984,564	344,335	36.1	

POMOLOGICAL PARAGRAPHS

Boron

In all instances known to the writer, where boron deficiency symptoms have appeared in apples this summer it was correlated with the failure on the part of the grower to apply boron. Fruit was examined in orchards in the drought-stricken areas of south-eastern New England but no deficiency symptoms were observed. The growers of these orchards have been applying boron regularly.

At one of the recent twilight meetings the question arose as to what effect an excess of boron would have on the fruit. Research has shown that heavy ground applications of borax caused early harvest of Jonathan apples and serious breakdown of late stored fruit. It has been noted also, with this and other apple varieties that preharvest drop and the change from green to yellow ground color were hastened on trees heavily fertilized with boron. Because of the deleterious effect of excessive boron it is recommended that in no case should the rate of one application of borax exceed 50 lbs. per acre.

Pressure Testing Pears

Several growers have asked the pressure suggested for pears when using a pressure tester as a guide in determining when pears should be picked. (For pressure testing pears use the small pear head, 5/6" diameter). The pressure suggested for several pear varieties are as follows:

Anjou	13-15 lbs.
Bartlett	17-20 lbs.
Bosc	14-16 lbs.
Seckel	16-18 lbs.
Winter Nelis	14-16 lbs.

---Editor

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NEW YORK STATE PASSES LAW CONCERNING SALE OF CONTROLLED ATMOSPHERE STORED FRUITS AND VEGETABLES IN THAT STATE

The following quotation is taken from chapter 400 of the Laws of New York. This law is now in effect.

"No person shall sell or exchange or offer or expose for sale or exchange or transport for sale any fruits or vegetables represented as having been exposed to "controlled atmosphere", "modified atmosphere", alone or with other words, or shall so use any such term or form of words or symbols of similar import on any container or lot of fruits or vegetables advertised, sold offered for sale or transported for sale within this state unless such fruits or vegetables have been kept in a room or storage building with not more than five percent oxygen for a minimum of ninety days. A record on a form approved by the commissioner shall be kept at a convenient location adjacent to said room or storage building from the day of sealing to the day of opening of said room or storage building, and shall be subject to review by the commissioner or his authorized agents at any time for a period of at least one year."

Passage of this law means that any shipper of C. A. Apples to any part of New York State must be in a position to prove that such apples have been held for

at least 90 days at an oxygen level of not more than 5 percent. It seems desirable that all C. A. operators keep an accurate daily log. The following form although not approved by the New York State Commissioner of Agriculture would contain the essential information.

C. A. Storage Record

Room No.

Date	Time	Temp. °F.	Percent			CO ₂ Scrubbing		Air Added (Minutes)
			CO ₂	CO ₂ + O ₂	O ₂	Minutes	Caustic soda Added lbs.	

Since keeping a daily log on each C. A. Room is standard procedure this requirement can be readily met.

This New York law, also, means that C. A. apples cannot legally come on the market in New York State until about mid-January even though held at 5 percent oxygen or less before the 90 days are up. Most C. A. rooms are not down to 3 to 5 percent O₂ much before the middle of October.

---F. W. Southwick

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PLANT BUG INJURY TO APPLES IN 1957

More than the usual amount of injury to apples typical of Tarnished Plant Bug is showing up this year in orchards all over Massachusetts. Fortunately the injury does not often seriously affect the marketability of the fruit but growers and others are puzzled to know why it is there and why their spray program failed to control it.

This injury was studied quite extensively in 1938 by Dr. O. H. Hammer then of the Hudson Valley Laboratory of the New York State Agricultural Experiment Station. He describes feeding punctures as small superficial dimples and egg laying scars as much deeper depressions with some russeting and sometimes considerable distortion of the fruit. The injury usually appears at the calyx end but may be elsewhere if the main plant bug activity occurred after petal fall.

Injury of this type is correlated with certain weather conditions prior to or during bloom. Plant bugs lay eggs and feed in the succulent tissues of a large number of crop plants and weeds. New terminal growth, buds, and developing fruit of many trees and shrubs are attacked likewise. Often plant bugs become very numerous in the Fall and search out sheltered places in or near orchards in which to hibernate. Whenever a series of unseasonably warm days precedes or occurs during bloom the overwintering bugs are stimulated to move out of hiding. The new growth and tender, developing fruits on apple, pear, and peach trees furnish excellent tissues for feeding and egg laying.

We had such conditions in 1957. April was warmer than normal and the maximum temperature reached 75° or above on 7 of the final 10 days. Again, during the period just before and during apple bloom, maximum temperatures reached 80° or above on 4 successive days. These were ideal conditions for plant bug emergence and activity.

Most of the insecticides now being used, except lead arsenate, will kill plant bugs hit by the spray. Some like DDT, dieldrin, methoxychlor, and some organic phosphates have considerable residual action if the insects crawl about over a good deposit.

Injury occurred in 1957 because the bugs emerged from hibernation and moved into the trees during those hot days. Many went directly to the blossoms and young fruits without danger of being hit by a spray or of crawling over a lethal deposit. By the time the Petal-fall applications were made the injury had already been started but was not so easily seen then as later when the fruit became larger.

---E. H. Wheeler

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CAREERS IN AGRICULTURE

Surveys conducted for the American Association of Land-Grant Colleges show that there are each year at least 15,000 new jobs for agricultural graduates, with less than 8,500 young men and women being graduated each year. Jobs are available each year to agricultural college graduates in: Research, Agricultural Industry, Agricultural Business, Agricultural Education, Agricultural Communication, Agricultural Conservation, Agricultural Service, and as Farm Managers.

---Editor

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ABANDONED ORCHARDS IN MASSACHUSETTS

As one phase of the Fruit Tree Survey an effort was made to obtain information on the extent of abandonment of orchards over the past fifteen years and the reasons for such.

When a similar survey was made in 1940 reports were received from 1,576 growers who operated orchards of 100 trees or more.

This 1940 list of growers was submitted to County Agents and others who were asked to delete all whom they knew were no longer in the orchard business and to add names of persons who have become fruit growers since 1940. The revised list contained a total of 901 names. This is 675 names or approximately 43 percent less than reported in 1940.

During the 1955 survey a report was made on each of the 901 names on the corrected list. 371 of these are operating orchards with 100 or more trees, 438 are no longer in the orchard business and 92 were not considered as commercial apple growers.

Hence, while there were 1,576 apple growers with 100 or more trees in 1940, there were only 371 in 1955 or a decrease in the number of commercial growers of approximately 76 percent.

While, at first glance, it would appear that fruit growing in Massachusetts is on the decline such is not the case since production of apples has increased rather than decreased during the past fifteen years. This means that the small farm orchard has been replaced by specialized commercial orchards.

What's the story on these abandoned farm orchards? Why were they abandoned? How large were they?

In order to get an answer to these questions, rather definite information was obtained in the current survey on 203 abandoned orchards. The average size of these orchards was $14\frac{1}{2}$ acres ranging from 3 acres to 50 acres. The principal reasons given for abandonment are shown as follows:

Reason for abandonment	Percent
Unprofitable	20.7
Sold for house lots	15.0
Owner deceased	12.3
Undesignated	12.3
Old age or ill with no young generation to carry on	9.8
Lost interest	7.9
Converted to livestock including poultry	6.0
Sold - new owner not interested	3.9
Converted to market garden, field crops or hay	3.5
Financial difficulty	3.4
Other employment	1.5
Tornado and hurricane	1.0
Miscellaneous	2.7

This can be summarized in these words: it takes a live, interested, healthy, energetic, intelligent person to stay in the fruit growing business today and make it pay.

---O. C. Roberts

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WHAT IS A FRUIT TREE WORTH?

As in many states, fruit growers in Illinois are losing trees because of highway development. The difficulty confronting the growers is that there is no basis on which to price their land and trees. To remedy the situation a special committee of the Illinois Horticulture Society was appointed for the purpose of deriving a standard on which to base tree evaluation. The following are the committee's recommendations as to what a fruit tree is worth: peach trees should be valued as \$2.00 per year up to fifth year, 40¢ per year from 5 to 16 years of age, no gain in accumulated value between years of 16 and 20 and then a decrease in value of 40¢ per year from 20 years on. It was recommended that apple trees should be valued at \$3.00 per year up to the age of nine and an increase of \$1.00 per year from 9 to 20 years. For apple trees of 20 to 25 years no increase in value and from the age 25 and over a decrease in value of \$1.00 per year.

Using these formulas, the maximum value of a peach tree (at the age 16 to 20 years) would be \$14.40 and for an apple tree (age 20 to 25 years) would be \$38.00. These formulations are for evaluation of fruit trees only. The committee recommended that the land prices be assessed separately and at the going land sale price of the specific area.

The tree value recommendations are to be compared with cost records obtained from other states and if they are in accord the recommendations will be presented to the Illinois State Horticultural Society for approval.

---W. J. Lord

A DEVICE FOR CUTTING APPLES INTO CUBES FOR USE AS MOUSE BAIT

The control of mice is an important orchard practice and must be done every year. Mice, if not controlled, will girdle trees 25 years old or older, resulting in serious loss to the grower.

The best control of mice is obtained by the use of poisoned apple cubes placed in the mouse trails or in runs made with the trail baiting machine recently developed by the U. S. Fish and Wildlife Service.

Cutting bait is quite a chore and growers ask each year about a better way of cutting up apples than with a knife.

The other day I visited Clarence Faulkner, Rodent Control Specialist with the United States Fish and Wildlife Service who is located in Durham, New Hampshire. He showed me how he had remodeled a commercial horizontal french fry cutter so it could be used cutting apples into cubes for mouse bait. The cost was about \$15.00 and about one hour of labor.

The materials required are a horizontal french fry cutter with 5/8 inch pusher block and die, (can be purchased from any restaurant supply house), 1 hack saw blade 1 inch wide. (A) sharpened part way on one side; a piece of strap iron 1 inch wide, 1/8 inch thick and 13 inches long (B) to be used as a support for one end of the hack saw blade; a piece of strap iron 1/2 inch wide, 1/8 inch thick and 9 inches long (C) to be used as a stop for the apples; a 2 x 6, 15 inches long for a base (D) on which the cutter is mounted; a small piece of sheet metal (E) for a stop for the hack saw blade; a short piece of rubber hose for handle on the hack saw blade and a few screws and stove bolts. Holes are drilled in the pieces of strap iron so they can be fastened to the wood base as illustrated in photograph no. 1. Bend the pieces of strap iron as shown in the photograph. It is necessary to reverse the die and cutter blades in order to have a smooth cutting surface for the hack saw blade knife to ride over when slicing the apple. This will require removing the blades, grinding about 1/16 of an inch off the back of each cutter blade and redrilling the holes in the vertical ends of the die.

In order to allow the pusher block to be moved far enough forward in the slide it is necessary to cut two slots 3/4 of an inch long and 3/8 of an inch wide in the slide at the base as shown at (F) in photograph no. 2.

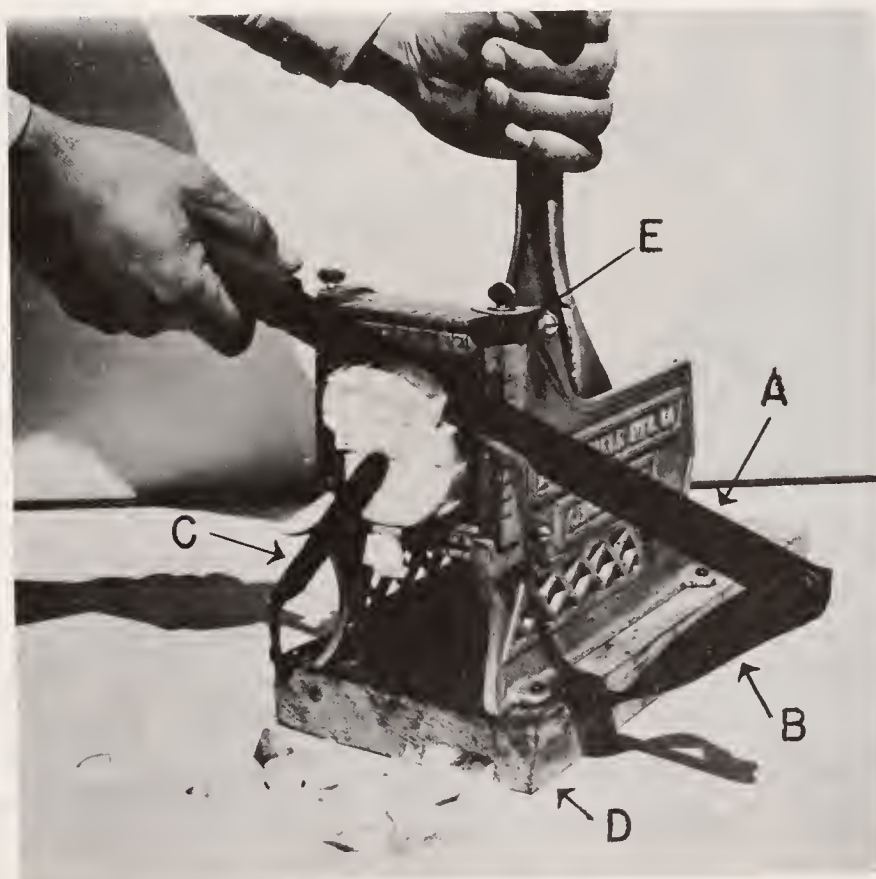
There may be some difference in the construction of different makes of french fry cutters, but the grower should be able to make the necessary changes in remodeling so that it can be used for cutting apples into cubes.

To cube the apple push it through until it touches the strap iron stop which should be 5/8 of an inch from the front of the cutter blades, and then slice off the projected part of the apple with a downward stroke of the hack saw blade knife.

A half inch mesh screen can be used to catch the cubed apples, and to remove the smaller pieces not suitable for bait.

---E. J. Rasmussen

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(Continued on Page 9)

TRACTOR INJURIES FATAL
Lincoln, Vt., Dec. 9 (AP)—
Jenkins told report...
Knox...
returne...
size beds...
Coroner Walter E...
The co...

FIREMAN DIES DUE TO SHOCK
Girl Killed by Tractor in Second Tragedy

Two persons were killed and two more seriously injured in non-traffic accidents in Maine yesterday.

Gen. James Van Fleet, former commander of America's forces in Korea, is national chairman of the Foundation which formed to...

Man Killed By Tractor
Littleton (N. H.) Man Dies Under 12-Ton Bulldozer

insulin... the older...
get along without...
weight. While...
partial for food...

BULLDOZER KILLS MAN
ELMIRA (AP)—A 15-ton bulldozer overturned near Pine City...

00-Mile Made
Lloyd, 48...
ago that he...
of the street...

he started...
e. A few...
raged to wall...
a clipboard...
ed, notebook...
are shoele...
which he...
A to Z...

Extension Service
University of Massachusetts

ice officer and which he led as...
vice-commander and commander...
for two...
He has demon...
strative ability and...
this he was...
finance com...
been a...

Tractor Overturns, Kills Maine Man
EAST DIXFIELD, Maine, Dec. 9 (AP)—
stoves, \$45 and up; Couches...
and up; livingroom sets...
and up; bedroom sets, \$40...
washing machines...
size beds...
Coroner Walter E...
The co...

Bulldozer Kills Vermont Boy
FERRISBURG, Vt., Aug. 17 (AP)—
er Girl Neigh...
Coroner Walter E...
The co...

NEVER:
1. Refuel Tractor when hot.
2. Service Tractor when running.
3. Run Tractor inside a building.
4. Allow riders.
5. Walk back on drawbar and step back on other machine to make adjustments.
6. Wear loose clothes or gloves when making adjustments.
7. Hitch to axle — use drawbar.

TRACTOR ACCIDENT FATAL IN VERMONT
MORRISTOWN, Vt., Sept. 14 (AP)—Harold...
Cale, 14, was killed...
Rat...

Easy Does It
MONTREAL (AP)—The owner of an 18-ton bulldozer was ordered in Quebec superior court to pay \$343.65 damages when the machine cracked the cement foundation of a house under construction...

Tractor Operator Is Saved
The operator was saved from the wreckage of a tractor that had overturned...

Tractor Crushes Boy's Legs
But He Doesn't Let Out a Peep

West Springfield, Aug. 26—Nine-calibre shells, the war-heads that exploded the shells. Not only did the Clark-Aiken shop make them; they made the automatic machines which clipped them off from long steel rods at the rate of hundreds...

his plans for...
pansion were adopted...
pleted under the direction of...
Arthur W. Babbitt at a cost of...
\$700,000.

Maine Girl, 5, Crushed Fatally Under Tractor
YARMOUTH, Me., Aug. 27 (AP)—
A five-year-old girl was fatally crushed today under a tractor in a hay field.

Tractor Upsets, Fatally Injures Holderness Man
HOLDERNESS, N. H., July 29 (AP)—
employees, and runs that ag...
the establishment as his...
He has a huge staff, mostly...
ladies who wear outfits that...
no pockets and profit no...
from a \$5 tip than from a...
vice employee was at work on...
property in North Holderness...
by his sister, Mrs. Hattie...
another sister, Miss...
of Nashua.

2 Children Badly Hurt By Tractor, Motor Car
FITCHBURG, May 10—Two children were injured in separate accidents...

Tractor Operator Is Saved
The operator was saved from the wreckage of a tractor that had overturned...

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The operator was saved from the wreckage of a tractor that had overturned...

Tree Fights Bulldozer, Operator Is Injured
AGAWAM, Sept. 10 (AP)—
The top of a bulldozer working on a land-leveling job, caught a tree branch today and pulled it back like a huge catapult.

Released, the branch sprang back and struck the bulldozer course, but many restaurants and clubs lease their hat check privileges to Ellis for annual fees ranging from \$20,000 to \$55,000. He then takes over, establishes his...

Crash Victims
Vehicle Hurtles Down Steep Hill Out of Control

are few diseases as...
as diabetes. When insulin...
and the diabetic...
it could be rem...
a normal...
weak...
fee...

Tractor Operator Is Saved
The operator was saved from the wreckage of a tractor that had overturned...

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Live to farm

Farm to live

FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

OCTOBER 15, 1957

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Apple Squeezings
Pomological Paragraphs
Combatting Orchard Mice
Orchard Mouse Bait Requirements



Issued by the Cooperative Extension Service, James W. Dayton, Associate Dean and Director,
in furtherance of the Acts of May 8 and June 30, 1914; University of Massachusetts, United
States Department of Agriculture and County Extension Services Cooperating.

Publication Approved by George J. Cronin, State Purchasing Agent, No. 19.

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Contributors to this issue from Supporting Fields

Lawrence D. Rhoades, Extension Specialist in Farm Management

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CREDIT FOR FARMERS

In the ordinary course of events it is estimated that about 8 out of 10 farmers in Massachusetts use credit at some time during the year. The sources they use may be quite varied but credit is extended whenever goods or services are acquired without full payment at the same time.

There are only four means of obtaining the capital needed in farming and they are: to inherit it, to get it as a gift, to save it from earnings or to borrow it. Very often the needed amounts are obtained by a combination of two or more of these means.

For many farmers it becomes a necessity to borrow in order to establish a large enough capital structure to produce farm earnings which will provide a desired standard of living. Borrowing capital, however, has its risks and hazards.

A sound and profitable farm and home management program requires a plan for the most efficient and profitable use of capital whether borrowed or not. Putting such a plan into operation requires making arrangements to get the needed capital on a satisfactory basis.

For the farmer who must seek capital through borrowing, three important steps are involved:

1. He must consider and evaluate the benefits and risks which are concerned with borrowing.
2. He must decide how to effectively organize and present his case to a prospective lender.
3. He must decide what specific agreements should be included in the loan contract after it has been determined that a sound basis for credit exists.

Since modern farming calls for substantial amounts of capital to be most profitable, many farm families must take the risks of borrowing. They should be calculated risks -- potential benefits balanced against potential risks.

Here are 10 rules to follow:

1. Use loans only for things that will increase income -- needed machinery, livestock, feed, seed fertilizer, etc., that will earn income -- they are productive investments.
2. Limit debts to amount needed to operate efficiently. Select your loan purpose to bring the largest dollar return in the shortest time.
3. Study and estimate future price trends. Discount future prices and give full value to costs.
4. Keep debts in line with your net worth -- what you own minus what

you owe -- drops in value affect assets not debts which are in dollars.

5. Estimate your probable income -- gross cash farm income minus cash farm expenditures leaves cash available for family living and interest and principal payments on debts. You may not be able to cut family living costs when the going is rough.
6. Have a definite repayment schedule -- if the loan is for operating expense then plan to pay from the proceeds of crops or livestock for which the loan is used. Funds borrowed for items with a longer life should be repaid before the items purchased with borrowed funds become unproductive or are replaced.
7. Be fair, frank and bussinesslike at all times with your lender. He can be of most service if he understands your operation and the results you expect. Pay promptly or if circumstances prevent this arrange in advance for further consideration.
8. Select a lender who is most likely to be willing and able to go along with you if bad economic conditions develop.
9. DO NOT BORROW for an enterprise which is not fully familar to you. A trial run on a limited scale with your own funds may be wiser than plunging into an unfamiliar deal.
10. Remember insurance for added risks -- Be sure your property and liability coverage is adequate. In many cases borrowing increases debts without an offsetting increase in assets at the time. Life insurance may be needed to protect your family in case debts are heavy and risks are high.

---L. D. Rhoades

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EXCERPTS FROM TALKS ON MARKETING METHODS, MICHIGAN
STATE HORTICULTURAL SOCIETY REPORT FOR 1956.

1. The Challenge of Our Changing Distribution System, by Stanley B. Davis, President International Apple Association, Inc. "The apple grower must realize that his trading days are about over and he must turn to scientific merchandizing if he is to receive a satisfactory return for his fruit." "Every fresh fruit and vegetable item, including apples, peaches and pears are in competition with other food items upon which millions of dollars are being spent for television, periodical, newspaper and radio advertising. The superior eye appeal and glamor of our product has offset somewhat the competitive pressure of this greater amount of advertising; however, we must start blowing our horn louder and longer if we want to maintain our favorable selling position in today's retail market."

"Apple growers as well as other fresh fruit and vegetable producers are going to have to forego the desire to perform the entire job of growing, packing and selling individually and cooperate in a joint endeavor with fellow growers to develop expert machinery in each of these fields to do the job efficiently. The

present traffic will not bear the extravagance of so many salesmen, packers and traffic experts."

2. Collective Bargaining for Better Apple Prices, by Edwin Mawby, Rockford, Michigan.

"Most apple grower meetings will find growers complaining bitterly about chain store buying practices, excessive wholesale profits, shady business transactions of truckers and brokers, processors stealing the crop and processors demanding the quality for which they do not pay. Very seldom does the grower blame himself for any of the weaknesses in his industry. He likes to grow them, turn them over to somebody else and then sit back, relax and complain. He hopefully waits for the government, for his local broker, a chain store, his marketing extension specialist, or some other good Samaritan to come along and solve his problems. The apple grower, being the basic producer of apples, must accept the responsibility for the manner in which his product is packed, distributed and sold to the consumer."

"Opinions have been expressed that the apple industry is drifting; that it does not have a clear, concise long-range view of what it wants or hopes to attain in the future. There is a definite need for more industry planning in regard to varieties to plant, expansion of apple acreage, development of new apple byproducts, and the uniform standardization of packaging of these products for the consumer. The apple industry in the past 10 to 15 years has had an attitude that by freezing out some producing sections, by bulldozing out some of the poorer varieties, and by squeezing out the small producers, in other words, decreasing the supply, the price will be higher and the survivors of the industry will be financially better off. This thinking is contrary to the planning and thinking of progressive business men in the world today. If we are to survive as an apple industry in today's expanding economy, we must plant more orchards, build more processing plants, produce more and better apples cheaper, in order to maintain our position in the food producing and distribution field. We as an industry must be very careful that we do not find ourselves in the position of being too small an industry to compete with other fruit producing industries. We must fight to expand and maintain large volume production."

"I sincerely feel that there are enough young growers who have the vision, the ambition and the ability to work and strive to again put apples as King of Fruits, a No. 1 fruit both processed and fresh. It is our responsibility to see that people are given the opportunity to have this healthful fruit at their disposal at all times of the year throughout the world. If each adult in the United States would eat an apple a day, instead of brushing his teeth, it would take 438,000,000 bushels of apples for this project alone. The horizon is unlimited."

---A. P. French

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EFFECTS OF BAGGING APPLES ON QUALITY

The following excerpts are from an article by G. D. Blanpied, Cornell University that appeared in the Proceedings of the One Hundred and Second Annual Meeting of the New York State Horticultural Society.

"Let's look at some facts on how prepackaging in consumer unit polyethylene bags affects some of the facets of quality. My comments will be based on tests

which we have conducted at Cornell. These tests are by no means exhaustive, but I feel they are indicative.

Flesh Firmness

Flesh firmness is certainly one measure of quality which everyone employs. To be sure, small differences in pressure tester readings mean nothing to the layman, but I think most people prefer a reasonably hard McIntosh to a soft one.

We have worked with McIntosh, Cortland, Delicious, and Golden Delicious to determine whether or not bagging has any effect on flesh firmness. The treatments included one and two weeks of continuous exposure to 70°F.; two weeks of alternating temperatures of 70° during the daytime and 32° at night; and two weeks at 32°F followed by two days of 70° and twelve days at 80°F. In only three of the fourteen tests were there differences in excess of one-half pounds difference in flesh firmness. Differences in incidence of water core of Delicious accounted for two of these three cases.

Our tests indicate that bagging has no significant effect on flesh firmness.

Skin Shivel

Thirteen separate tests were carried out with McIntosh, Cortland, Delicious, and Golden Delicious apples to determine the effect of bagging on water loss and subsequent skin shivel. The differences in weight loss varied from five times as much water lost from Golden Delicious in bulk as compared to comparable apples in poly bags at 70°F to differences of only one and one-half times as much water lost from bulk Delicious apples as compared to bagged Delicious apples stored at alternating temperatures at 32° and 70°F.

In every case, the bagged fruit lost less weight than the bulk stored fruit. Whether or not this skin shivel retarding effect will benefit your apples depends upon how long and at what temperature your apples are kept in bags.

Decay

Decay of bagged apples is a real threat and a detriment to quality. One rotten apple in one bag will hurt the appearance of a bagged apple display. Almost every rotten apple I have found in polyethylene bags has been inoculated at a skin puncture. Our studies indicate that punctured fruit will show a higher incidence of decay in poly bags than in bulk displays at 70°F.

It is well to remember that fruit with stem punctures and other unhealed cuts are culls.

Scald

Some apple handlers have expressed the opinion that bagging increases the incidence of storage scald. We have carried out three separate tests with Rhode Island Greening in bulk and bag displays to determine the effect of bagging on the appearance of scald. Our tests show that bagging in polyethylene has no significant effect on the appearance of scald.

We haven't encountered it yet, but it is conceivable that apples kept in consumer unit polyethylene bags for a month or longer during the first six to eight weeks after harvest might show more scald than apples which were not confined in poly bags.

Air-Tight Bags?

Limited tests with air-tight consumer unit polyethylene (150 g) bags at the Cornell pomological laboratory have indicated that apples will not significantly benefit from a sealed bag environment and it is sometimes a dangerous practice.

Summary

Summing up our work at Cornell, it may be said that prepackaging apples in consumer unit polyethylene bags will reduce the amount of water lost from the apples and increase the amount of decay of punctured fruit."

---W. J. Lord

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START NOW TO CONTROL FUSICOCCUM PEACH CANKER AND PEACH LEAF CURL

There are two peach diseases that require grower attention in the fall. One is Fusicoccum peach canker and the other, peach leaf curl.

Peach canker infections start in buds on the current season's growth in rainy weather in September and new infections continue to occur until cold weather. The cankers resulting from the infections begin to appear in October and continue to appear through winter and spring. Spores produced on them infect leaf bud clusters, leaf blades, and the base of soft tender new shoots in rain periods after bloom in spring.

Not all orchards have peach canker. Where it is present, a program of pruning and protective spraying is suggested.

Pruning out of diseased twigs and branches should be done while trees are dormant and also in June.

Spraying should be started in mid or late September according to Dr. E. F. Guba, with applications at 10 to 12 day intervals, preferably before rains, and should be continued until nearly all the leaves have fallen from the trees. As with all spraying, thorough coverage is necessary. Satisfactory results have been obtained by Dr. Guba from spraying with a mixture of $\frac{1}{2}$ lb. dichlone (Phygon) and 1 lb. of ferbam in 100 gallons of water with 1 pint of glyodin added for better wetting. Captan at 2 lbs. and thiram at 2 lbs. have also been effective.

To obtain control of peach canker, the preventive spray program with dichlone-ferbam mixture should be continued in spring. Start with early Delayed Dormant and make applications in Pink, Petalfall, and Shuck fall.

Where fall and spring spraying are done for peach canker, it will also control peach leaf curl. In orchards where there is no peach canker, a spray of 1½ lbs. ferbam in 100 gallons applied in the fall after leaves have dropped or in the spring before the buds have started to open should give satisfactory control if the spray is applied thoroughly so that it coats the buds.

--- C. J. Gilgut

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APPLE SQUEEZINGS

The Cider Certification Program is again in the full swing. Many of you who have cider mills are contemplating going under this program. Be sure as you make improvements, that they fall in line with the requirements of the program. Even if you have no thoughts of joining the program, but do plan to make improvements, it would be well to make them with the Cider Certification Program in mind as our aims and the requirements of the State Food and Drug Division are for all purposes identical.

With the warm days of Fall here, I suggest that you check your sanitation program and also observe if your present fly-control system is working adequately. Odors and flies can do more to discourage a customer from coming back than most anything else other than poor quality. For most cider mills, a good dairy cleaner will work well in washing the equipment down and insuring that it is kept in clean condition. Use it on the press, the racks, the cloths and from time to time on the walls and floors to help keep the mill smelling sweet. Removal of pomace from the immediate area of the press room at the end of the day's run will help your fly control program. Follow the recommendations for fly control given by Dr. Wheeler in the July-August issue of Fruit Notes and especially pay attention to those sprays that may be used in food plants.

We all know that it is difficult to make good cider early in the season as we have to wait for the later varieties to give us the desired characteristics. However, wherever possible, use as many different varieties as you can as these will blend together to give a better cider than if only one variety is used. Another thought along this line, and that is, as soon as your cider is pressed, refrigerate it. The colder it is, the less likelihood there will be of any spoilage taking place and the better your customer will like it. Remember that if a customer buys a gallon, it has to remain sweet until all of the cider is gone. If this spoils before it is all consumed, the buyer will be disappointed and perhaps not be a repeat customer.

This is the time of the year to advertise sweet cider. By getting your customers into the habit of picking up a container of cider now, you can build the sales later in the year. Advertise your products, advertise them truthfully, but make them aware of the fact that you have sweet cider for sale early in the year and you will find your sales will lengthen out over the period of time.

A Note on Inspection

Food and Drug Inspectors will undoubtedly be dropping into cider mills throughout the state during the next three or four months. Be sure that at all times your mill can stand inspection. We know because of the process a cider mill cannot always look neat and clean, but any pomace or other debris

should be fresh rather than old dried up leavings from the previous pressing or two. Always when you are through, even though it may be late, give the mill a good hosing down and plan to finish the cleaning in the morning. If you leave it stand overnight, then your work is almost doubled in trying to make it a clean, sanitary mill. Remember sweet cider can be used to attract customers to your stand which in turn should aid in the sale of your other products.

--- Kirby Hayes

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POMOLOGICAL PARAGRAPHS

Importance of Two-Spotted Mite Control

In the Preharvest Drop Control test conducted this fall the importance of keeping the two-spotted mites population within bounds was clearly emphasized. Apple drop was heavy from the limbs carrying foliage injured by the two-spotted mites. The low limbs where good spray coverage was difficult, without special effort on part of the growers, were the ones usually carrying mite injured foliage. In many cases, a high percentage of the dropped fruits picked-up under the trees came from a relatively few limbs which carried foliage injured by the two-spotted mites.

Is Your Cider Sweet?

In this issue of Fruit Notes appears an article by Kirby Hayes, Extension Marketing Specialist, Food Technology, in which he stresses the importance of selling sweet cider that will remain sweet until it is all gone. Too many cider producers are not concerned enough about this fact. The writer knows of a person who buys cider quite regularly from cider mills throughout the state and has been disappointed too often in what he bought. Several times the cider that looked good when purchased had to be poured down the sink. This does not build repeat sales! No customer should be sold cider that has been displayed in the sun or a warm room for any period of time. Even though cider has been refrigerated the person offering cider for sale should sample it to be sure that it is still sweet.

---W. J. Lord

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COMBATTING ORCHARD MICE

Orchard mouse control recommendations emanating from other parts of the country seem to offer great promise and hope for a simple control measure. As yet, we have not found these "Shangri-la" methods as meeting all the requirements of a good control method. Our recommendation this year remains substantially the same as last. The use of Endrin is not approved.

Last year Doctor Lord and I made a field trip during which we found many fruit growers making major mistakes in their application of a baiting program. Some of these mistakes we discovered in the field were as follows:

1. Using last year's oats. Zinc phosphide oats are mixed upon order at our Bait Mixing Station and they are calculated to maintain their toxicity for about four-six months in the original shipping containers. They will not hold over to the next season.
2. Using zinc phosphide purchased many years ago. Some growers were found still using old red-colored cans of zinc phosphide rodenticide. Zinc phosphide can be safely stored in its original container for about three years. Do not use any material older than this. All zinc phosphide rodenticide currently being prepared will have the year date stamped on each container.
3. Placing bait only at the tree base. Bait must be placed in mouse runways when hand baiting.
4. When using mechanical trail builder, just carelessly dropping bait behind the furrower. Bait must be placed right in the artificial runway.
5. Failure to clean around tree bases. Girdling can occur at any time of year and is always encouraged by heavy cover against trunks of trees. Clean mowing or grubbing around tree bases will reduce chances of early season damage.

Apparently many growers are not following the recommended procedures to the letter, and this is necessary. It is suggested that each grower take a few minutes time to sit down and review the procedures as outlined in our new leaflet on orchard mouse control and see that his program is according to Hoyle. Orchard mouse supplies this year will be available at many more sources than formerly. County Extension offices will not handle baits, but they have been furnished with a list of our cooperating suppliers and can inform you of your nearest distributor.

Present conditions indicate that there will be a lot of dropped apples remaining on the ground during the baiting program. This may slightly decrease the attractiveness of your apple bait. It is still one of the best baits, dropped apples or not, but under these conditions we recommend also the use of zinc phosphide-treated oats in conjunction with the apples. The combination bait is always recommended where pine mice are present.

The Fish and Wildlife Service Staff is now fully manned in this state with the addition of Mr. Fred Courtsal, stationed at the Extension Office, 36 Harvard Street, Worcester, Massachusetts, and covering Eastern Massachusetts. Mr. John Peterson, stationed at Amherst, Massachusetts, is our field man for Western Massachusetts. Individuals desiring aid in their mouse control program are invited to contact these men.

---Wesley R. Jones

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ORCHARD MOUSE BAIT REQUIREMENTS

The following figures are to be used as a guide in determining the amount of bait to be used in Orchard Mouse control. These are minimum figures, for in actual practice it is found that fruit growers are quite generous in their quantity of

bait applied. If you are the liberal type, double the bait requirement listed.

HAND-BAITING INFORMATION:

10 Pounds of Zinc Phosphide-treated Stem Crushed Oats

- = 900 teaspoon-sized bait placements.
- 225 trees baited with oats only.
- = 450 trees baited with apple and oats.

1 can Zinc Phosphide Rodenticide (1-ounce can)

- = 16-20 quarts of treated apple.
- = 1600-2000 apple baits.
- = 400-500 trees baited with apple only.
- = 800-1000 trees baited with apple and oats.

TRAIL-BUILDER BAITING INFORMATION:

- (a) One acre of trees, spaced at 40' x 40', requires 2,160 feet of machine-trail.
- (b) One acre requires about 540 baits at 4-foot spacing.
- (c) One acre requires 5-1/2 quarts of apples only or about 1/3 ounce of Zinc Phosphide Rodenticide.
- (d) One acre requires 6 pounds of oats only.
- (e) One acre of combination baits requires about 1/6 can of Zinc Phosphide Rodenticide and about 3 pounds of poisoned oats.

---Wesley R. Jones

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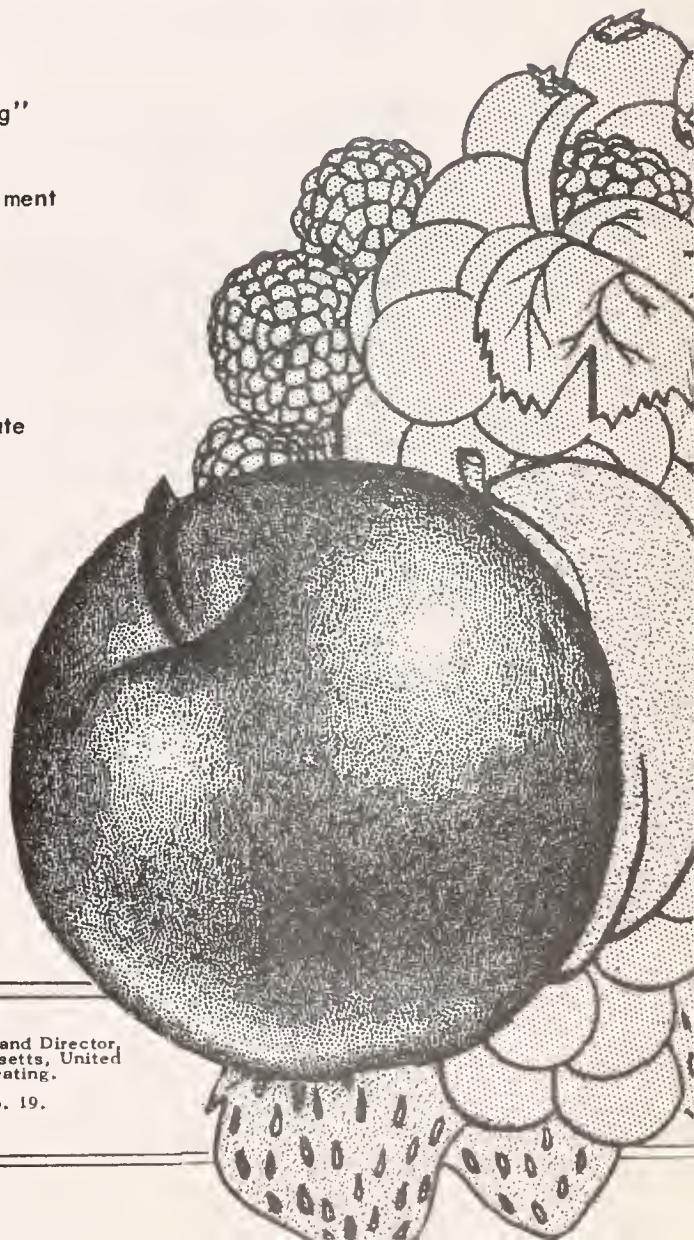
FRUIT NOTES

NOVEMBER – DECEMBER 1957

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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HOW DO YOU FIGURE INTEREST OR CREDIT COST?

In these days of interest rate increases it helps sometimes in deciding where to get credit to know how to figure interest rate or cost reduced to some standard. In these examples we have used the actual annual rate of interest as the standard.

You trade your car or truck for another one and the difference is \$960 and your old car is the down payment. You are asked to sign a 12-month note to a finance company with monthly payments of \$89.51. How much interest will you be paying?

$$\$89.51 \times 12 = \$1,074.12 = \text{Total amount to be paid}$$

$$\text{Principal amount financed} = \$960.00$$

$$\text{Finance or interest charge} = \$114.12$$

$$\text{Average amount outstanding during the year} = \$520.00$$

$$\$114.12 \text{ divided by } \$520 = 21.95 \text{ per cent interest}$$

When the monthly payment plan or any other plan calling for equal and evenly spaced payments is used, one way to figure the actual rate of interest charged is to use the following formula:

$$\frac{\text{Total of finance charges}}{\frac{1}{2} \text{ original loan}} \times \frac{\text{No. of payments}}{\text{No of years}} \times \frac{1}{\text{No. of payments} + 1} = \text{Actual Annual Rate of Interest}$$

Substituting figures in the last example:

$$\frac{114.12}{480.00} \times \frac{12}{1} \times \frac{1}{13} = \frac{1369.44}{6240.00} = 21.95\% \text{ interest}$$

If you can borrow the money from a lender who charges 6 per cent of the face amount your annual rate will be 11.08 percent annually and you will save \$56.52 over the cost from the finance company.

If you borrow the money from a lender who charges 6 per cent of the face amount and deducts it from the note (discounting) then your rate will be 11.78 and you will have "paid" the interest in advance. The note to give you approximately \$960 (actually \$958.80 would be for \$1020 = \$61.20 would be deducted for advance interest payment and the calculation using the formula would be as follows:

$$\frac{61.20}{479.90} \times \frac{12}{1} \times \frac{1}{13} = \frac{734.40}{6238.70} = 11.78\% - \text{the actual annual rate of interest}$$

Carrying Charges

Instead of interest, some time payment plans include "carrying charges" and sometimes other names are used such as "credit" charge. Like the old Frenchman's

comment after his first experience with potato whisky, "she don't taste lak' she read on de barrel.", names mean little, the charge made is what counts. Converting to annual interest is not difficult. Here is one example. You decide to trade your old tractor for a new one costing \$2250. You are allowed \$1,000 on your old tractor leaving \$1,250. A carrying or credit charge of \$125 is added for a total of \$1,375 on the note and you are to pay in two installments, one at the end of six months and one in twelve months, of \$687.50 each.

Using the formula, you figure

$$\frac{125}{625} \times \frac{2}{1} \times \frac{1}{3} = \frac{250}{1875} = 13.3\% \text{ as the actual annual rate of interest.}$$

You need to add up all the charges to get the cost of using borrowed funds. You will be likely to run into some unusual names, charges, and methods. They are all designed to separate you from your money. Credit has a cost but costs vary widely between lenders. A sharp pencil and a pad of paper are excellent farm tools when used frequently and wisely. Pick your lender for lowest cost and most favorable terms to you.

--Lawrence D. Rhoades

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"THE TEN COMMANDMENTS OF APPLE MARKETING"

An article by Carroll R. Miller in the Maryland "Fruit Growers' News Letter" contains much food for thought and is reproduced here for the benefit of Massachusetts fruit growers.

1. It is the Law of The Profits that good markets exist only where Demand goes ahead of Supply. Therefore build Demand, and yet more Demand, for your apples.
2. Diligently teach your customers the merits of apples; for only a fool buys that for which he knows no use. Prepare the market carefully, in advance: for education costs only pennies per bushel but the price of ignorance is in dollars.
3. A thousand growers shall not attempt to sell their apples to seven buyers; for verily the growers will cut each others' prices to pieces, and the buyers will wink and laugh. But seven sellers and seven buyers make a firm market and fatten the pocket book of all.
4. He who sells by under-cutting his neighbor's price has thrown a boomerang which will return to smite him. His neighbor shall cut in his turn, and both will be sorely wounded in the hip-pocket.
5. You shall not attempt to market a puny volume of apples: for the seller of a million bushels attracts the hard-cash buyers but the push-cart peddler must hunt the by-ways and alleys for bad-check customers.

6. Unless you are a professional salesman as well as a grower, hire yourself a salesman: for the amateur cannot compete equally with the professional, and the buyers of apples today are surely professionals.
7. Guard diligently against over-filling the nearby markets, for a glut ruins the price-level and the blight speeds by telegraph over land and sea. Offer your apples to many cities, for apples grow only in certain spots of this terrestrial ball, but all the people of all the nations hunger for fruit.
8. Strive mightily for a stable market, for therein the merchant buys tomorrow's needs freely and with confidence. But when the price-cutters enter, the merchant withholds buying, lest his competitor buy cheaper or tomorrow's fruit be lower: and the unsold apples pile up like a dammed river, unto the bursting thereof.
9. Forget not that the Eye controls the Purse Strings; that bruises are repulsive and poor color looks shabby: and that your apples must sell themselves in the super-markets alongside 70 other fruits and vegetables.
10. An honest grade is a delight to all merchants and brings re-orders: but a deceitful or a sloppy pack induces wrath and rejection.

---O. C. Roberts

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POMOLOGICAL PARAGRAPHS

External Symptoms of Boron Deficiency

Generally there is no external evidence of boron deficiency in apples, however, severely affected fruits may have pebbled or very noticeable roughened surface particularly near the calyx end of the fruit. These symptoms were found on McIntosh, Rome and Cortland apples.

More boron deficiency was found in fruits from young trees because of the tendency of some growers to forget them when it comes to applying borax.

Garden Tractors for Mowing

Very little hand mowing is done in orchards today, therefore, a garden tractor with a sickle-bar mower or a roadside mower might be a good investment. These work very nicely around young trees and mature trees pruned to eliminate low hanging limbs. However, under mature trees with low hanging limbs the mowing job is a "man-killer". Also, these mowers are useful in many areas around the orchard and farm buildings where mowing with a regular mowing machine or orchard rotary-mower is impractical.

One Massachusetts fruit grower likes to use his garden tractor with the sickle bar mower attachment around young trees because fewer trees are sheared-off than with standard mowing equipment and hand mowing is eliminated.

Hand Thinning Apples

The question was asked about desired fruit spacing when hand thinning apples. Experimental evidence has shown for most varieties that fruits should be thinned to allow about 30 to 50 leaves in the vicinity of each fruit. The usual commercial practice is to space the apples from 6 to 8 inches apart on the branch with Delicious apples being spaced farther apart than McIntosh. The spacing will vary depending upon fruit set on individual limbs and upon location, variety, tree age, soil moisture, etc. In some instances there may be a relatively small number of apples on a limb but these are clumped together. In these cases the fruit should not be thinned or only lightly thinned. Apple varieties which inherently set heavy crops, unless chemical thinning is successful, require more hand thinning than other varieties. In years like this past summer no matter how much hand thinning was done satisfactory fruit size could not be obtained from trees in some locations. More fruits may be left near the periphery (outside) and top of older trees than near the center because of greater wood vigor, leaf surface and more light.

Some Orchards Still Need Lime!

Although the use of lime in apple orchards has been stressed for a number of years, many growers are still not following this recommended practice. It is surprising the number of growers that have not limed their orchards for a number of years. Apparently the problem of soil acidity exists in other states.

Dr. E. G. Fisher, Cornell University, states that soil acidity is certainly one of the major nutritional problems in Western New York. In the Proceedings of the 102nd Annual Meeting of the New York State Horticultural Society he says: "About 67% of the soil samples we collected in the Western New York area were at or below pH 4.9. An acid soil condition often leads to magnesium deficiency. Based upon soil or leaf analysis, about 40% of the samples we collected showed a need for increased magnesium levels."

Another condition brought out by the 1956 New York State leaf analysis was the low potassium level in many of the Western New York apple orchards. About 68% of the samples analyzed indicated a need for potassium. As Dr. Fisher stated, "This does not mean that 68% of the Western New York orchards need potassium fertilization. There is a decided tendency for us to be called into problem orchards. It does mean that many of our problem orchards are low in potassium."

Apple Box Dumpers (Box Turners)

While visiting apple package sheds during the month, the writer observed two growers using hand-operated mechanical apple box dumpers. These were obtained from manufacturers of apple grading equipment. However, apple box dumpers can be constructed by growers having a well-equipped farm shop and probably for half the price. Although the dumped apples were not checked for bruises, the growers definitely felt that the mechanical apple box dumpers reduced the number and average size of bruises.

The dumping operation is most efficient when the boxes are transported to the dumpers by means of a roller conveyor. The end of the conveyor should be close to and about an inch higher than the box holder platform so that the operator can slide the box up to the platform. With the mechanical dumper and conveyor, it is the writer's opinion that a woman can handle the job of dumping the apples on the grader

---W. J. Lord

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RESULTS OF A PREHARVEST DROP CONTROL EXPERIMENT WITH McINTOSH APPLES

Since the failure of 2,4,5-TA to satisfactorily control preharvest drop of McIntosh in 1955 there has been much speculation concerning the future of this material. Consequently, additional attempts were made in both 1956 and 1957 to compare 2,4,5-TA with other materials or their combinations to determine whether or not failure of 2,4,5-TA in 1955 was just a chance happening. Of course, extent of fruit ripening from stop-drop hormones must be considered, also.

In 1956 we had a moderate crop plus a cool, late growing season and fruit drop was of minor importance. All materials were reasonably effective. However, two applications of 20 ppm of NAA gave somewhat better drop control than one application of 2,4,5-TA. Neither treatment had any appreciable influence on fruit ripening in 1956.

This fall, with a large crop and a very dry year it seemed likely that a much heavier drop of McIntosh might be expected than occurred in 1956. Consequently, a stop-drop test was set-up in the hope of getting additional comparisons among materials. In Table I are data obtained from our 1957 experiments.

Table I. The influence of several materials on the rate of preharvest fruit drop of McIntosh apples. 1957

Treatment*	Date Appl.	Av. Cumulative Percentage of Drop						Ave. Flesh Firmness (lbs.)
		9/9	9/13	9/18	9/20	9/23	9/27	
1. Check		.9	5.2	16.9	20.8	27.0	31.5	15.1
2. NAA -20 ppm	9/6	.3	1.1	5.4				
NAA -20 ppm	9/18				7.7	9.7	10.9	15.2
3. NAA -20 ppm	9/6	.5	1.6	6.7				
2,4,5-TP-20 ppm	9/18				10.0	15.4	16.8	15.0
4. 2,4,5-TP-20 ppm	9/6	.7	2.6	7.1	8.3	10.9	12.9	13.9
5. 2,4,5-TA-20 ppm	9/6	.4	2.7	11.5	13.8	17.8	20.3	14.8
6. 2,4,5-TA-20 ppm + Tween 20-(4 oz/100 gals)	9/6	.8	3.3	9.2	10.6	13.0	14.6	14.0
7. 2,4,5-TAA-20 ppm	9/6	.8	4.6	10.5	11.4	12.9	14.0	12.3

*7 trees per treatment

Av. yield per tree - 37.8 boxes.

From the data presented it appears that 2 applications of NAA at 20 ppm (treatment 2) will give as good or better control of drop than any other material or combination of materials tested. Treatment 2 was also about twice as effective as 2,4,5-TA over a 3 week period. Use of Tween 20 as a wetting and penetrating agent seems to increase the ability of 2,4,5-TA (treatment 6) to control drop but appreciably increases the ripening influence of the compound.

On the basis of the work in 1955, 1956 and 1957 it seems that the most reliable suggestion we now have for preharvest drop control of McIntosh apples, for a 3 week period and with a minimum amount of fruit ripening, is 2 applications of NAA at 20 ppm.

---F. W. Southwick

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USE OF MATERIALS OUTSTANDING IN 1957 CA CONSTRUCTION

CA storages constructed in Massachusetts this year were built with a variety of materials. Growers and construction men have demonstrated considerable ability in the utilization of different materials to suit the particular problem at hand, and still keep costs down. In many cases the materials going into the structural elements, the insulation, the vapor barrier, and the gas seal have been integrated in a unique way.

Most rooms satisfied the pressure-relaxation test (1" down to .1" water gage in not less than 30 minutes) and all have successfully come down to 3% oxygen in good time. The majority of the rooms came down in about 12 days. Some of the tightest rooms ever built in this state were built this year.

Of course, the best all around materials for use in CA construction have yet to be found. The case, at the present time, is to employ the materials most adaptable to the type of construction being used. Whether the structural frame is steel, wood, or masonry determines what type of vapor barrier, gas seal, and insulation can be used to the best advantage.

A close look at the materials in the catagories of structural frame; insulation; and vapor barriers and gas seals, illustrates the wide variety to be found. Of the nine different storage sites where CA rooms were built, 3 were conversions from regular refrigerated fruit storage to CA and 6 were new CA construction. The 3 converted rooms used an aluminum foil - sisal kraft paper ("brownskin"), or an asphalt emulsion reinforced with fiber glass net for the gas seal. Of the 6 new rooms, 4 used masonry construction, 1 wood, and 1 steel. In these 6 new rooms, 4 utilized rigid block type insulation, 1 blanket insulation and 1 fill insulation. Gas seals in the 6 new rooms were: plastic coated plywood entirely on 2 rooms, and partially on 1 room; asphalt emulsion reinforced with fiber glass net partially on 4 rooms; and sheet metal partially on 2 rooms. The partial catagories mentioned above mean that more than one type of material was used to seal a room. This was also true of insulation. The block type of insulation can be used efficiently with steel and masonry side walls, whereas the fill type insulation gives greater economy and ease of installation in ceilings.

As the specific functional requirements of the structure, the insulation, and the gas seal become better understood, it can be expected that materials will be used even more effectively in the future, resulting in greater economy and reliability in CA construction.

---J. W. Zahradnik

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WHAT IS A SEMI-DWARF APPLE TREE?

The answer to this question is not so simple as it first appears. To some people it may mean a tree propagated on any of the East Malling rootstocks, to others it may mean a tree propagated on a specific stock such as East Malling VII, while there are still others who think of a semi-dwarf tree as one which has an interstock of one of the East Malling rootstocks. One can readily see that tree performance can not be the same for the three categories and that a state of confusion exists in regard to terminology with respect to semi-dwarf trees.

In order to have an idea as to what constitutes a semi-dwarf tree, one must first have an understanding of the East Malling rootstocks. This series of East Malling rootstocks, usually shortened to "EM rootstocks," is identified by Roman numerals rather than by name. These stocks differ from seedling stocks in that they are propagated by layering or cuttings rather than from seeds. EM stocks are clones or rootstock varieties and each stock originated from a single individual the same as the McIntosh variety originated from a single individual. The degree of tree vigor which EM stocks will produce depends on which numbered stock we choose; it ranges all the way from very dwarf, semi-dwarf, vigorous to very vigorous. For example, EM IX produces a very dwarf tree; VII a semi-dwarf tree; XIII a vigorous tree and XII a very vigorous tree. The degree of dwarfing which a given rootstock will produce also depends on the variety which is propagated on it. Vigorous varieties will not have their growth restricted so much by a semi-dwarfing stock as will weak varieties. A weak growing variety may have its growth restricted too much by EM VII while a vigorous variety may have its growth controlled to the desired size.

Another method of controlling tree size is by the use of an interstock of one of the EM very dwarfing stocks such as EM VIII or IX. This method consists of inserting a short stem piece of EM VIII or IX between the seedling rootstock and the scion variety. The degree of dwarfing obtained by this method depends upon the length of the stem piece and EM stock used for the stem piece. Trees which are produced in this manner will be larger than trees which are budded directly to the rootstock used as the stem piece. For example, if EM VIII is used as an interstock the trees will be somewhat larger than trees which are grown directly on EM VIII roots; similarly, if EM VII or II is used as the interstock the trees will be larger than trees on EM VII or II roots. In other words, trees produced by the interstock method are not identical with trees grown directly on a given EM stock.

In light of this discussion it should be apparent that the terms dwarf and semi-dwarf have very little meaning, unless the variety, rootstock and method of propagation are stated. The following method of designation, such as McIntosh/EM VII, and McIntosh/EM IX/domestic seedling root, is suggested as a means of avoiding the confusion regarding dwarf and semi-dwarf trees. McIntosh/EM VII signifies a McIntosh scion on an East Malling VII rootstock, while McIntosh/EM IX/domestic seedling indicates a tree which comprises a McIntosh scion with an intermediate stem piece of East Malling IX on a domestic seedling root. If nurserymen would adopt this method of designation in their catalogue listings and fruit growers would place their tree orders on this basis, then the grower would be more likely to get the kind of tree he wants.

---W. D. Weeks

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FURTHER INFORMATION CONCERNING THE SALE AND SHIPMENT OF CA APPLES IN
NEW YORK STATE

In the September 1957 issue of Fruit Notes is a copy of the recent New York State Law concerning the sale of controlled atmosphere stored fruit and vegetables in that State. We have recently received rules and regulations in respect to this law from the Department of Agriculture and Markets, State of New York, Albany, N.Y. Rather than attempt to interpret these instructions, for those of you interested in CA apples, a copy of them follows:

STATE OF NEW YORK
DEPARTMENT OF AGRICULTURE AND MARKETS

I, DANIEL J. CAREY, Commissioner of Agriculture and Markets of the State of New York, having held a public hearing at the City of Albany, New York, on the 28th day of August, 1957 to consider the adoption and promulgation of Rules and Regulations Relating to the Use of the Term "CONTROLLED ATMOSPHERE" and other Words of Similar Import when Applied to Fruits and Vegetables, and proof having been received at such public hearing, and due deliberation having been had, now, therefore, pursuant to the authority conferred upon me by Sections 18 and 156-f of the Agriculture and Markets Law to supplement and give full effect to the provisions of Article 12-A of the Agriculture and Markets Law relative to the Grading of Farm Products, and particularly to Section 156-dd thereof relating to Controlled Atmosphere, do hereby adopt and promulgate the following Rules and Regulations, viz:

1. Definitions: "Commissioner" means the Commissioner of Agriculture and Markets of the State of New York.

"Department" means the Department of Agriculture and Markets.

"Person" means any individual, corporation, partnership, association or other organized group or persons, or any business entity, by whatever name designated and whether or not incorporated.

2. The following rules and regulations apply only to rooms or storage buildings containing apples.

3. Any person owning or operating a controlled atmosphere room or storage building or packers or repackers of apples coming under the provisions of the Section shall register with the commissioner on a form prescribed by the commissioner. The registration period shall commence on August 1 and end on July 31 of each year. Owners or operators of such a room or storage building shall register on or before August 1 of each year except the registration period for apples grown in 1957 shall commence on November 1, 1957 and end on July 31, 1958.

The Commissioner shall assign each approved registrant a registration number preceded by the letters CA. This number shall be marked on all containers coming under the provisions of this Section and shall be in accordance with all provisions pertaining to markings as set forth in any Article of the Agriculture and Markets Laws.

4. Each owner or operator shall make the required air components determinations daily. The percent of oxygen shall be reduced to five percent within twenty (20) days after date of sealing.

5. Records: Each owner or operator shall maintain a record for each room on an approved form or forms. It shall include owner or operator's name and address, room number, date of sealing, date of opening, capacity in bushels, lot identification, number of bushels within each lot, daily air constituents determination recordings showing date of test, time of test, percentage of carbon dioxide, percentage of carbon dioxide and oxygen, percentage of oxygen, temperature and comments.

Any person selling, offering for sale or transporting for sale within this State apples coming under the provisions of this Section shall furnish an invoice covering the sale of such apples. Each invoice shall indicate the CA registration number assigned to the owner or owners of the controlled atmosphere room or storage building in which each lot or lots of apples included thereon were kept. Each invoice shall also include the CA number required to be marked on each container within each lot of lots of apples included thereon.

Each owner or operator shall submit to the Department, within twenty days after date of sealing, a report in writing, for each room showing room number, date of sealing and number of bushels contained therein.

6. These rules and regulations shall become effective on the 15th day of October, 1957.

SEAL

Dated and Sealed at the
City of Albany, New York
this 7th day of October, 1957.

S/ Daniel J. Carey
DANIEL J. CAREY, Commissioner of
Agriculture and Markets of the
State of New York.

---F. W. Southwick

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CIDER NOTES

Containers

A change appears to be in the making insofar as cider containers are concerned. The new two quart (half gallon) paper container is finding wide acceptance, especially the certified carton. Customers remark on the ease of handling, less room required in the refrigerator, and its cleanliness. A point that has also been brought out is that children can pour their own, rather than wait for parents to lift the gallon jug.

Operators like it as it does away with washing, label removal and the discarding of non-food jugs that are turned in.

- * Be sure you store paper containers so that dust and dirt do not fall into the empty container.
- * If you use a twin-pak handle, be sure the staples are well clinched and properly placed -- mine wasn't!!!
- * Rotate your stock in the display area so no old cider is sold.

Apples

In visits this fall to mills, apple quality has been good. Be sure your cider apples are clean and sound throughout the season.

It only takes one rotten apple to alter the flavor and lower the quality of the whole pressing. Keeping quality is reflected directly by the type apples used.

Equipment and Cleaning

During cleanup pay special attention to the grinder and the pulp holding box below the grinder. Hose it down immediately, scrub with a brush and detergent-sanitizer, then hose again. Final step - inspect!

Plastic linings for tanks and other portions of the press are available. The cost is less than stainless, but I feel the life will be less also. Look over both before purchasing. Either one will cut down on cleanup time and improve not only your sanitation program but the looks of the press.

Cider Quality and Flavor

On flavor - use two or more varieties of apples for your cider, but be sure they add to the overall quality. A mixture of McIntosh, Baldwin and Northern Spy will please your customers, but some Delicious, McIntosh and Ben Davis won't go over quite so well.

Be sure to use your apples before they become mealy and overmature - yield is lower and so is flavor.

Final Thought

One good thing about always telling the truth is that you don't have to remember what you said!

---Kirby M. Hayes

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FERTILIZING CULTIVATED BLUEBERRIES

It has been reported that blueberry bushes have been injured as a result of using the amounts of fertilizer suggested in Pomology Sheet No. 2 which has been included at the end of this article. The injury appears to have occurred because the amounts given were used as a ring application. The table was not intended to be used in this way. "Pounds per acre" in that table means pounds to be distributed evenly over an entire acre, 43,560 square feet. If the fertilizer is applied as a ring or row application, then the amount should be reduced so as to keep the rate constant.

Around blueberry bushes the use of ring applications of a readily soluble fertilizer like nitrogen is a risky practice unless one knows how to do it correctly. The roots of the blueberry bush are usually very near the soil surface and, therefore, subject to injury by improper or careless use of

fertilizer. It is very easy to apply the fertilizer in too narrow a band and concentrate it to such an extent that injury results. Young bushes are especially susceptible to this sort of injury. Therefore, when fertilizer is applied to young bushes, it should be applied just beyond the root zone rather than right over it. Fertilizing a strip or band down the rows is much safer, faster, and easier than ring applications. The fertilizer can be broadcast along the row, thus avoiding the danger of concentrating in spots over the roots.

In Pomology Sheet No. 2 it is suggested that the fertilizer application be split, half being applied in the early spring before bloom and the other half about June 1. There were several reasons for this. Splitting the application would give a better distribution of nitrogen available to the plants during the early part of the season. The June application would give the bushes a push just as fruit starts to ripen. Where high rates of nitrogen are used, splitting the application would ordinarily be less likely to result in injury.

Weather can have a very marked role in this practice of split applications. If there is a prolonged drought in late spring so that the soil becomes very dry, as happened in 1957, an application of fertilizer during the dry period might be risky. If the application is followed by just enough rain to put the fertilizer into solution, the soil solution might become concentrated enough to cause considerable root injury. Under dry conditions it might be better to reduce the amount of fertilizer or even omit it altogether, unless irrigation equipment can be used to thoroughly wet the soil.

It is obviously impossible to give directions which will satisfy the needs of every blueberry field. Nor can specific directions or qualifying statements be given in the limited space of a single page. It was for these reasons that the following statements appear in Pomology Sheet No. 2: "The amounts are suggested-----". "The amounts used should be based on the size, vigor and productiveness of the bushes". "The quantities recommended should be increased or decreased as experience indicates". In other words, the table is just a starting point. The amount actually given should be adjusted to the needs of the bushes.

Pomology Sheet No. 2

FERTILIZER APPLICATIONS FOR CULTIVATED BLUEBERRIES

Years after Plants are set	Annual Application of Fertilizer						For 10 bushes (pounds)
	Pounds per acre						
	Combination						
	10-10-10	10-10-10	Sul.Am.	Sul.Am.	7-7-7	5-8-7	5-8-7
0	100	100	--	--	145	200	1-3/4
1	200	200	--	--	270	400	3½
2	300	200	50	--	430	600	5½
3	400	200	100	200	570	800	7
4	550	250	150	275	610	1100	10
5	700	350	175	350	1000	1400	12-3/4

Other fertilizer mixtures may be as good as those listed. The amounts in the table are suggested for an overall, broadcast application. If the entire area is not covered, the amount applied should be adjusted accordingly. The amount used should be based on the size, vigor and productiveness of the bushes. Where fields

are in heavy sod or have been recently mulched with shavings, sawdust or other woody material, it is usually desirable to increase the nitrogen 50-100 percent.

In column 1, 0 indicates the year the plants are set. At this time soluble nitrogen carelessly used can injure the plant. Wait until the plants are established, about June 1, to apply the fertilizer. Spread it out well around the plants on a clear, dry day.

10-10-10 (column 2) is rapidly becoming a standard formula. The quantities recommended should be increased or decreased as experience indicates. It may be desirable the second or third year to split the application - half before bloom and half about June 1.

In columns 3 and 4 is given a combination of 10-10-10 to be applied in April and sulfate of ammonia to be applied June 1. Sulfate of ammonia, containing 20 percent nitrogen, is too strong for very young plants and replaces only 1/3 of the nitrogen 2 yrs. after planting. Thereafter it can replace more.

The sulfate of ammonia only program in column 5 is for older bushes and for those which have been receiving liberal amounts of complete fertilizer. Since blueberries probably need all the elements, it is advisable to use an application of complete fertilizer every third or fourth year.

Column 6 gives the amount of 7-7-7 fertilizer which would be required to give the same amount of nitrogen as the 10-10-10 mixture.

Column 7 gives the amount of 5-8-7, 5-10-5, 5-10-10, or any other fertilizer containing 5 percent nitrogen, required to give the same amount of nitrogen as the 10-10-10 mixture.

The last column reduces the quantities in column 7 to amounts suitable for 10 bushes.

---John S. Bailey

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FRUIT NOTES

JANUARY 15, 1958

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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WHAT IS AN ORCHARD WORTH?

The drastic changes in the fruit industry over the past 15 years and the taking of land for public use have made the problem of orchard valuation of interest to orchard operators. The statement has been made that orchard owners have no basis of determining value. This statement in itself is suspect since all property has some value to someone although value may be lower or higher depending on circumstances.

There are two general problems and they are:

- (1) The problem of determining value to set a sales price.
- (2) The problem of determining value under condemnation or land taking for public use.

The problem of determining a value for the purpose of a sales price is usually a matter for an appraisal either by the owner, his representative or by a trained appraiser. An appraisal is always an opinion. An appraisal by a trained and experienced appraiser is usually a composite based on observation of the property in its present condition and experience of the appraiser. It frequently is a composite of many opinions on parts of the farm and its setting.

The value of an orchard is determined by the production after development and the cost of maintaining that production. Any orchard will be in one of three conditions:

- (1) A developing orchard - on the way up in production.
- (2) A producing orchard - in full production.
- (3) A declining orchard - going down in production.

When reaching a value for a developing orchard it is necessary to determine whether development can continue until the orchard is a producing one. If this seems likely then there are some requirements for a successful orchard:

- (1) The soil is important and it should be suitable for the varieties being grown as well as the type of fruit - apple - peach - pear.
- (2) The orchard should be located in a fruit area where there are other successful orchards.
- (3) Markets should be established.
- (4) Some plan for replacement should be indicated.
- (5) Hazards of climate, drainage and requirements for irrigation should be minimum.
- (6) Wild trees, abandoned orchards and other pest and disease sources should be few and control of orchard damaging animals should be established.
- (7) Spacing and planting distances and varieties should meet accepted standards for the area.
- (8) Orchard layout should permit use of labor saving equipment in orchard care, spraying and harvesting.
- (9) Tree growth should be vigorous and evidence of good care should be present.

A producing orchard should meet all of the above tests plus having a record of high yields annually.

A declining orchard presents some additional problems. The property may have value for other uses. In this case the suitability of the soils for other crops becomes important and the cost of converting the orchard site for other uses becomes an item. If the reduced yields represent the start of a rather long period of declining yields, yield levels may still be such that continued operation is indicated and possible rehabilitation may be a consideration.

It is important in arriving at a value for a sales price to determine the stage of the orchard and then proceed to place a value on it by using all three of the generally accepted methods of determining value.

- (1) Values based on net income capitalization or "earning value."
- (2) Values based on comparison with other property which has changed hands or where values have been established.
- (3) Value based on reproduction cost.

Usually a sound answer to the question 'What is my orchard worth?' can be reached by considering all three of these and balancing them against each other to determine a basic value. The actual sales value would then be adjusted by comparison with sales prices of similar properties in the area.

The American Society of Farm Managers and Rural Appraisers have defined Present Market Value as follows:

"It is the price at which, within a reasonable time and with a substantial down payment, the property may be expected to change hands from a willing, able and informed seller to a desirous, able and informed purchaser."

The problem of determining value under condemnation or land taking for public use is somewhat different from that of determining value for a sales price or present market value.

Taking private property for public use upon payment of just compensation is condemnation. The legal basis is called the "right of eminent domain." Under this procedure the people or the government take private property for public use when public needs cannot be provided for in some other manner.

The requirement that no person shall be deprived of private property without just compensation is a part of the "right of eminent domain." The courts by their decisions have varied in just what is "just compensation."

Under the "right of eminent domain" it follows that the injured party who is entitled to "just compensation" has the responsibility of determining values. The fact that the owner prefers the particular property to some other does not mean that he is thereby entitled to additional compensation. Legal precedent and usage have tended to favor the property owner.

In general, courts have held that market value is the guide to be followed in determining awards and further, again in general, the measure to be used in determining damages in condemnation cases is market value.

The courts have defined market value in these terms quite generally:

Market value is the highest price, estimated in terms of money, which the property will bring, if exposed for sale in the open market, with a reasonable time allowed to find a purchaser buying with knowledge of all uses and purposes to which it is best adapted, and for which it is capable of being used.

In some instances the term "fair market value" is used and then is defined as a situation where the sale can be made for cash or terms equivalent to cash, at a price agreed on by an informed seller willing but not obliged to sell to an informed buyer willing but not obliged to buy.

The attempt frequently made to value property taken under eminent domain or for that matter in attempting to arrive at a sales price by valuing the property by units and adding the unit values to get a value for the property, is likely to be very misleading. It is a good deal like trying to arrive at the value of a used car by placing values separately on the motor, the wheels, the tires, etc. and then adding the unit values together. The value needs to be determined for the whole property and it is the loss in value of the whole property as a result of the condemnation or partial sale, that needs to be determined.

---Lawrence D. Rhoades

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BLUEBERRIES - A Look Ahead

Those who are familiar with the history of the blueberry industry know that much of the breeding work has been done by workers in the U.S.D.A. Following the retirement of Dr. F. V. Coville, Dr. G. M. Darrow took charge of the blueberry work and continued Dr. Coville's breeding program. Recently, Dr. Darrow also retired. Nevertheless, he continues to maintain a very active interest in what is going on. A recent letter from him contains some information of considerable interest and importance.

Quoting Dr. Darrow, "This year I saw beautiful ripe blueberries out of doors in mid-April at the University of Florida, resulting from Prof. Sharpes work. There is no doubt that an industry based on high flavored, light blue varieties can furnish fine fruit for the markets in April and May. Then at Jonesboro, Maine crosses of the Ashworth from north of the Adirondacks with Earliblue and with Bluecrop were perfectly hardy, and Dr. Whitton there is doing a fine job. Use of low temperature hardy Ashworth and frost-resistant Bluecrop in breeding should insure varieties giving regular crops throughout New England."

Many fine selections resulting from Dr. Darrow's breeding work are under test in fields of private growers in Massachusetts, Michigan, and New Jersey. In the near future, these should furnish a whole series of excellent varieties tailored to meet almost any market demand.

---John S. Bailey

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NEWER FRUIT VARIETIES WORTHY OF TRIAL

The following report briefly describes the newer fruit varieties under test in the University plantings that are worthy of trial by commercial growers and home gardeners.

These notes should be considered as supplementary information on varieties recommended for planting in Massachusetts as given in Extension Service Special Circulars #212-A, B, C, D, E, F, G, and H which are available from your County Agent or the Mailing Room, University of Massachusetts, Amherst.

APPLE

Red Melba - A red sport of Melba which is superior in color. Good quality for an early apple. Season early August. Recommended for commercial planting where an early variety is desired.

Puritan - A McIntosh x Red Astrachan cross which was made by Professor Sears at the University of Massachusetts about 1929. It is a handsome well colored red apple which ripens just ahead of Early McIntosh. Fruit quality is good for an early apple. The tree is hardy and vigorous but has a tendency toward biennial bearing. It will pollinate McIntosh. Puritan is being widely planted in Massachusetts. Growers who have it in production have been more than pleased with its performance and the prices it commands. Puritan is worthy of extensive trial.

Spartan - A McIntosh x Newton seedling from British Columbia. It is an attractive dark red apple with McIntosh shape and quality. Spartan retains quality in storage much better and longer than McIntosh. The fruit may have a tendency to be small. The tree is a vigorous McIntosh type. Harvest season is late September. It will pollinate McIntosh. Spartan shows great promise as a variety to extend the McIntosh season and should be given serious consideration for future plantings.

Idared - A promising Wagener x Jonathan cross from Idaho. The fruit has an attractive bright red finish. Fruit quality good but somewhat on the mild side. It has a long storage season. Harvest season is early October. Idared is one of the more promising late keeping dessert and general purpose apples.

Melrose - A high quality winter apple introduced by the Ohio Experiment Station. Melrose is a Jonathan x Delicious cross. The fruit is well colored, has good size and shape. It may develop some russetting unless given a mild spray program. The fruit has excellent dessert and cooking qualities and a long storage season. The tree is productive, has good structure, and is annual. Harvest season mid-October. Melrose is cross incompatible with Delicious but will pollenize other varieties. Melrose shows much promise as a replacement for Baldwin. It should be given extensive trial.

---W. D. Weeks

PEACH

SUNRISE - An early, attractive, medium size yellow peach which ripens a few days ahead of Early East. Fruit quality varies with season, but fairly good for an

early peach. A clingstone unless fully ripe. Suggested for limited trial where an early peach is desired.

EARLY EAST - A rather attractive good sized yellow peach. Fair quality, semi-cling, somewhat irregular in shape. Early East ripens about 10 days ahead of Golden Jubilee. Suggested for limited trial.

PRAIRIE DAWN - An attractive yellow fleshed freestone peach which ripens just after Jerseyland. Fruit juicy and good quality. Bud hardness above average. Worthy of trial.

HALE HARRISON BRILLIANT - A large yellow fleshed freestone which ripens 3 to 4 days before Elberta. It is better quality than Elberta and is worthy of trial.

---W. D. Weeks

PEARS

ALEXANDER LUCAS - An attractive French winter pear which is large, yellow with a blush and good quality. Its season is late fall and early winter.

CHAPIN - A seedling of Seckel which resembles Seckel in general characteristics but ripens nearly a month before Seckel. It is very sweet and excellent in quality.

EWART - A large greenish yellow pear netted with russet and has a fine, melting, tender, juicy flesh. The season is a month later than Bartlett.

GORHAM - Fruit resembles Bartlett in size, color, and shape. Ripens two weeks later than Bartlett and keeps a month longer. The quality is good to excellent. This variety is particularly recommended for dessert and canning.

RED BARTLETT - A sport of Bartlett which resembles Bartlett in every respect except color which is red rather than yellow.

---O. C. Roberts

RED RASPBERRY

EARLY RED - Originated at South Haven, Michigan as a cross between Lloyd George and Cuthbert. In season it ripens with Chief but has larger and somewhat better flavored fruit which is bright red. The canes are only moderately winter hardy and are moderately susceptible to spur blight. Worthy of limited trial where a berry of this season is desired.

MUSKOGA - This midseason variety originated at Ottawa, Canada as a cross between Newman 23 and Herbert. The fruit is medium size, light red, moderately firm and fairly good quality. Reported as extremely winter hardy in Canada. Winter killed 50% here in 1955-56 but only 20% in 1956-57.

PUYALLUP - Originated at Puyallup, Washington as a cross between Washington and Taylor. In season it appears to be about with Latham. Its fruit is rather large, firm, medium red, conic shape, with a distinctive flavor and very good quality. The last two winters it has shown somewhat more winter injury than Milton which is a bit too much for comfort.

Other new reds under test include Canby, Crimson Cone and New Hampshire. However, these plantings are still too young for even a preliminary evaluation of their fruit and plant characteristics.

Lack of sufficient winter hardiness of the canes continues to be the greatest weakness of most of the newer red raspberry introductions.

---A. P. French

STRAWBERRIES

Armored - (Blakemore x Aroma) This University of Missouri introduction looks very promising. The plant is very vigorous and forms many runners. The fruit is large, firm and of fine flavor. Armored falls short in fruit appearance and is not resistant to red stele.

Blaze - An introduction of the New Hampshire Experiment Station. The plants are vigorous and produce a moderate number of runners. The fruits are large, light in color with white centers, fair in firmness and good quality. Blaze is not resistant to red stele, but is worthy of trial where this disorder is not present.

Earlidawn - (Midland x Tennessee Shipper) This U.S.D.A. introduction has been the earliest ripening variety in our trials the past two years. The plants are productive, of moderate vigor and form a satisfactory number of runner plants. The fruit is of medium size, firm, tart and of fair to good quality. Earlidawn is susceptible to the common strain of red stele but may be of value where red stele is not a factor, because of its earliness.

Pot-o-gold - Introduced by E. A. Wright of Plympton, Massachusetts. The plants are tall, vigorous and produce a fair number of runners. The fruit is large, firm, attractive and good to very good quality. The seeds are hard and prominent. The yield of Pot-o-gold was rather disappointing in 1957 but it appears to merit further testing as a late ripening variety.

Redglow - (Fairland x Tennessee Shipper) A U.S.D.A. introduction for the midseason. The plants are tall, vigorous and produce numerous runners. The fruits are attractive, of medium to large size and of good quality. Redglow is resistant to the common strain of red stele but is susceptible to mildew.

Surecrop - (Fairland x Md. U.S. 1972) An introduction of the U.S.D.A. and the Maryland Experiment Station. The plants are tall, vigorous and produce numerous runners. The fruit is of medium size, attractive and of good quality though tart. Surecrop show promise where red stele is a problem.

Several of the newer varieties were quite disappointing this past season. Phelps, Orland and Redstar all showed very poor vigor and low yields. Crimson Flash, probably identical with Midland, lacked the vigor and production of the virus-free Midland

---J. F. Anderson

BLUEBERRY VARIETIES

The most important question varietywise that growers must answer is "shall I plant any of the 'Big Six'?" We have been recommending them for trial and a few growers are trying them, but plantings are still not extensive. However, as a group, they look more promising all the time.

Earliblue is the best early variety produced so far. It will be a good replacement for Weymouth, Cabot and June.

Ivanhoe was one of the original "Big Six". It is a second early to follow Earliblue. When it was introduced, it was recommended for North Carolina and suggested for trial farther north. At the Cranberry Station it has never been overly vigorous and crops have been light. One grower in a very favorable situation has been fairly successful with it. Its value in Massachusetts is questionable, especially since the introduction of Blueray.

Blueray was introduced in October 1955. Only a few trial plantings have been made in Massachusetts. The berries are very large, attractive and fine flavored. Its outstanding characteristic is frost resistance. This character alone should make it worthy of extensive trial. It ripens in Ivanhoe season and will probably replace that variety.

Bluecrop produces very large, attractive, light blue, fine flavored berries. Where it has been tried, it appears to be a heavy producer.

Berkeley looks better all the time. The berries are very large, attractive and mild flavored. The bush is vigorous and productive. This variety has unusually good consumer acceptance because of its mild flavor which more nearly resembles that of the native wild lowbush berries so dear to the New Englander's heart.

Herbert produces extremely large berries which are somewhat flattened and tend to be slightly five sided. The bush is turning out to be more upright and vigorous than first trials indicated.

Coville is slowly gaining in grower favor. The bush is vigorous and productive. The fruit is large and medium blue. The main objection has been its tartness. Since the berries hang to the bush well, this objection can be overcome by leaving the berries on the bush till they are thoroughly ripe. When this is done the tartness disappears and the berries have an unusually fine flavor. Growers who have tried leaving them on the bush report that consumers come back and want more of them.

One grower, who likes to experiment, is trying Murphy and Wolcott. These two varieties together with Angola were introduced for use in North Carolina because of their resistance to stem canker. It is doubtful if they will be of much value in Massachusetts.

---J. S. Bailey

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A PURITAN GOES TO DENMARK

In 1954 Puritan scions were sent to Count F. M. Knuth of Bandholm Denmark. This last September we received a letter and colored photograph of Puritan from the Count. He is very much impressed with the performance of Puritan to-date. If the performance of Puritan can be judged by the colored photograph which he sent us, there is no doubt that the variety has given an excellent account of itself. The size and color of the fruit of Puritan was "wonderful" to quote the Count. He also commented, "I was rather confident that a variety of Massachusetts origin would become a success."

---W. D. Weeks

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STRAWBERRY VARIETY TRIALS - 1957

The following table lists, in order of earliness, several of the strawberry varieties which were fruited in the University variety trials last summer.

Variety	Season of Ripening and Yield			Calc. Yield Quarts per Acre
	% Early	% Late	Season Classification	
Earlidawn	47.4	13.8	Very early	10172
Stelemaster	43.3	18.1	" "	5286
Phelps	38.0	19.2	Early	2335
Howard V.F.	37.2	17.5	"	5501
Midland V.F.	37.0	18.2	"	9588
Crimson Flash	37.0	25.4	"	3462
Surecrop	28.4	23.9	Midseason	7713
Redglow	22.8	22.4	"	6976
Vermilion V.F.	22.2	29.4	"	4794
Fairland	21.6	30.2	"	8912
Temple	21.2	31.9	"	6668
Catskill V.F.	18.5	39.3	"	12814
Fairfax V.F.	17.9	43.0	"	8912
Empire V.F.	16.7	36.8	"	10018
Robinson V.F.	13.0	41.0	Midlate	10479
Maine 55	9.9	36.6	Midseason	6207
Monmouth	7.0	30.5	"	7713
Armored V.F.	6.2	36.3	"	11524
Blaze	4.8	49.6	Midlate	10325
Orland	4.6	33.8	Midseason	4026
Sparkle V.F.	4.1	57.9	Late	11032
Pot-o-gold	3.0	47.3	Midlate	4487
N.H.-F13	2.7	60.4	Very late	8297
Redstar	.5	64.3	" "	3073
Strafford	.0	78.2	" "	4978

Eleven pickings were made during the season. The "% early" column indicates the percentage of the total crop of each variety which was harvested during the first four pickings, June 7 through 14. Likewise, the "% late" column covers the last four pickings, June 24 through July 8.

This procedure lets us see just how much of the crop of each variety was harvested in the first, middle or last third of the season and thereby provides data by which to classify a variety as early, midseason, or late.

---A. P. French

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CYCLAMEN MITE - A Pest of Strawberries

What is This Pest: It is a tiny mite, practically invisible to the naked eye, much smaller than the common red spider or 2-spotted mite. It occurs on many different plants both in the greenhouse and outside. It sucks juices from the plant tissues.

Symptoms of Injury: Heavy infestations result in severe dwarfing and stunting. Early symptoms are a wrinkled, deformed appearance of the new leaves. The plants appear dense or crowded and the leaflets are held vertical rather than horizontal because of the shorter stems. Finally some of the inner leaves are killed outright. Crops are greatly reduced, worthless or lost altogether.

Seasonal Development and Habits: Adult females overwinter in crevices between the bases of leaf stems. Become active in spring but all active stages avoid light and require a high humidity. They remain in unopened leaves in plant crowns or between parts of leaves or flowers. Eggs, nearly as large as the females, are laid singly but as many as 3 each day for several days. Eggs hatch into larvae which feed, enter a "pupal" stage and then become adults. At 70° F. an entire generation requires only about 14 days. Just a few females on a plant when it is set can result in a heavy infestation before the season ends or before fruiting. Dr. Boulanger of Maine reported finding 1500 active mites on 20 leaflets on his unsprayed plants.

How Introduced Into a Field: Cyclamen mites get into a field most commonly on infested planting stock. Some infestations can be traced to movement from nearby infested plants or weeds.

How Are They Spread: (1) By migration from mother to daughter plants or adjacent ones, (2) carried by birds and insects, (3) wind-borne, (4) carried by workers in the fields.

Some Points Related to Control of Cyclamen Mite

Mites are in Protected Spots: Majority of the population remains within crown in unfolded leaflets or other parts and inside sheaths at base of stems. Hard to reach with a spray. Impossible to reach with dusts. Low-gallonge and low pressure sprays probably will not be effective.

Many Common Miticides do not Kill Cyclamen Mite: Allen and associates in California tested over 50 chemicals 1952-56. Found only 3 to be really effective: endrin (available but cannot be used during bearing year except after harvest); isodrin (not on the market); Thiodan (available for testing only). A 4th, Kelthane is only fair to good in single applications but may be used during fruit bearing year.

None of the organic phosphates (parathion, malathion, etc.) or the systemics (demeton, etc.) give effective control and in fact their use may result in more trouble.

Control of Cyclamen Mite - Strawberries

On Plants in the non-bearing year: OBSERVE all SAFETY PRECAUTIONS when handling or spraying with endrin. Do not use endrin on a fruiting bed except after harvest.

Material: endrin - emulsifiable concentrate containing 1.6 lbs. active ingredient per gallon PLUS a wetting agent.

How Much : 1 qt. per 100 gals. at 400 gals. per acre (or 1 gal. of concentrate per acre in from 300-500 gals.) PLUS excessive wetting agent

How and When: Whenever an infestation is discovered or as a preventative - spray, at 200 lbs. or more pressure, directly down into crowns of plants. An excess of water and a wetting agent are essential to satisfactory control

Repeat in 2 weeks in mid-summer, in 3 weeks when cooler.

Spring Treatment to Fruiting Bed, BEFORE BLOOM only:

Material: Kelthane - emulsifiable concentrate (EC) or wettable powder (WP) PLUS a wetting agent.

How Much: 1 qt. Kelthane EC or 2 lbs. Kelthane WP per 100 gals. at 400 gallons per acre (or 1 gal. of EC or 8 lbs. WP per acre in from 300-500 gals.)

How and When: After growth starts but BEFORE fruit sets - spray at 200 lbs. or more pressure directly down into crowns of plants. Use plenty of water to obtain thorough drenching.

Repeat in 10-14 days - Kelthane is not harmful to pollinating insects.

---E. H. Wheeler

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PREVENTION OF DEER DAMAGE WITH FENCING

In many areas of Massachusetts growers planting young orchards are faced with a problem of preventing deer damage. Many growers are afraid to prune their young tree because of the follow-up pruning given by deer. The browsed young trees are injured, delayed in coming into bearing and are poorly shaped. However, the states north of us appear to have solved the problem of deer damage in young orchards.

In Maine, whenever it is found impossible to keep deer from doing damage in orchards, the Department of Inland Fisheries and Game may enter into an agreement with the owner of the orchard whereby the Department may assume half the cost of fencing the young orchard. They supply fencing for young orchards only. Their present policy is to provide the wire fence while the grower sets the posts, provides the gates and strings the wire. It is the assumption of the Department of Inland Fisheries and Game that providing the wire represents about half the cost of the fencing job. It is felt that the program of supplying the fence for the young orchards suffering deer damage has not been overly expensive. It is thought that repellents will serve in some instances to prevent deer damage and that their effectiveness depends upon the variety and supply of feed available to deer as the seasons change. However, the only perfect repellent is wire fencing. The Department of Inland Fisheries and Game feel that their law works well, from both the standpoint of conservation of their deer herd and for the protection of orchardists. In addition, they stated that they do not feel the cost of the present program is unduly heavy and that in the final analysis sharing the cost of fencing these orchards, in the long run, does save money for the state.

The State of New Hampshire Fish and Game Department supplies six foot graduated stock wire to growers setting out orchards in areas having high deer population. Mr. James W. Alger, Game Damage Adjuster of the State of New Hampshire Fish and Game Department states that a total tree loss by deer browsing or horning could run to a figure where in two years the fencing will pay for its initial investment. He believes that the fencing, properly maintained will last twenty years. Mr. Alger states that the fencing program is of great value from the standpoint of grower attitude, for the fenced-in young orchards grow normally and no loss of tree growth is experienced due to set backs by deer browsing or horning. In addition, trees are often injured so severely that replanting is necessary.

He cites a case where 700 young trees were set out in June 1956, and the delivery of 30 rolls of wire was slower than they anticipated. As a result, deer damage was done between June and September which called for a damage payment of \$250. In this case if the damage were to persist for another year at the same rate, with the orchard unfenced, it would cost the state \$500. However, the wire cost the state \$420. and they are free of any future claims. Under the laws in the State of New Hampshire Fencing Program no damages are paid on the fenced areas.

Mr. Earl W. Young, a fruit grower in Temple, New Hampshire, has had a deer fence around his orchard for nine or ten years and thus far it has been 100% effective. It is a six foot woven wire fence which was set into a stone wall surrounding his orchard. Mr. Young stated that the posts set into the stone wall have held up well but posts set into the ground had to be replaced in three years with cedar posts. The original posts were pine. He states also that the only trouble experienced is with hunters that will not go around but climb over the fence breaking posts.

Mr. G. A. Morison, Upland Farm, Inc., Peterboro, New Hampshire, states that his deer fence is a four-foot woven game fence, with small mesh at the bottom gradually widening to about six inches at the top, and above this are three strands of barbed wire making the entire fence eight feet high. This fence is strung on pine or spruce posts. The fence has been very satisfactory and only once has Mr. Morison seen a deer in the orchards that was so fenced. He said, "This was a young doe, and from the tracks and hair left on one of the barbs, she jumped through the lower and middle strand of barbed wire, the space being 16 inches wide and the lower wire 5'4" above the ground, so she was some jumper."

Mr. Morison feels that after the trees are 10 to 12 years old it is perfectly safe to remove the fence.

Mr. Robert B. Farnum, Concord, New Hampshire, states, "Up in this country it is impossible to raise a young orchard without a fence. To date we have the entire orchard fenced with about 2 miles of wire. Our latest method has been to go into the woods around the edge of the orchard, cut a path and use the standing trees for posts. The fence is not straight but it saves the time of digging post holes and setting posts; also your posts don't rot off. There is danger of the wind blowing down trees over your fence and breaking down the wire, which means you must patrol the fence every few months through the year. The best check on deer can be made after the first fall of snow for the tracks. I would certainly hate to start another orchard in our area without a fence; it sure pays off. Be sure to pick a level path for your fence, for deer can crawl through very small holes. Also use a good grade of wire and it will last many years. Some of our wire has been up 20 years and still looks good."

Mr. Robert T. Burrows, Manchester, New Hampshire, had the post holes for his deer fence dug with a post hole digger attached on the back of a truck and found it saved considerable labor and expense. Mr. Burrows states, "We used a woven wire fence which I think is six feet high, with one strand of barbed wire above that when the ground outside is about level with the ground inside, and two strands wherever the ground outside is higher. We have used ten foot cedar posts and because they are set in the ground at least two feet in some parts of the fence we have nailed on a two by four inch extension for two feet extra in order to get a supplementary barbed wire up to a height of 8 feet. The fence requires some maintenance each year, such as replacing a few posts and general tightening up to keep the deer out. Finally on the question of gates we have used heavy wooden gates, but have come to the conclusion that light weight metal framed gates are more practical because of their lighter weight."

A New Hampshire apple grower reports that stringing rope, coated with creosote, on three stakes driven into the ground close to young apple trees seems to prevent deer browsing considerably. The young trees were replacement trees in a bearing orchard.

The blocks of young apple trees in this same orchard were fenced with a six foot woven wire fence. The grower was late in getting fencing around one block of trees and the trees suffered considerable deer damage but since the fence was erected no further deer damage has occurred.

---W. J. Lord

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

FEBRUARY 15, 1958

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COLOR REQUIREMENT FOR APPLES

The Massachusetts Apple Grading Law includes five grades in which color is a grade factor. These are: U. S. Extra Fancy, U. S. Fancy, U. S. No. 1, Mass. Extra Fancy, Mass. Fancy. A comparison of the color requirements of the several grades for a selected list of apple varieties is as follows:

	<u>U.S.Ex. Fancy</u>	<u>U.S. Fancy</u>	<u>U.S.No. 1</u>	<u>Mass.Ex.Fancy</u>	<u>Mass.Fancy</u>
Astrachan	25	10	Tinge	66	33
Baldwin	50	25	15	66	33
Cortland	66	33	25	66	33
Davey	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	50	20
Delicious	50	25	15	66	33
Duchess	25	10	Tinge	25	10
Early McIntosh	50	25	15	66	33
Gravenstein	25	10	Tinge	15	0
Macoun	66	33	25	66	33
Melba	66	33	25	<u>(1)</u>	<u>(1)</u>
McIntosh	66	33	25	66	33
Milton	50	25	15	66	33
Rome	50	25	15	50	20
Spy	50	25	15	50	20
Wagener	50	25	15	66	33
Wealthy	50	25	15	66	33
Williams	50	15	Tinge	66	33
Red Sport Varieties	75 (2)	50 (2)	25 (2)	(3)	(3)

(1) Not specified.

(2) Where red sport varieties are specified as such they shall meet color requirements specified for red sport varieties.

(3) Red sport varieties - - same as for regular varieties.

---O. C. Roberts

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PRUNING PEACH TREES

Peach growers are faced with the task of pruning trees which were in most instances left unpruned last spring. Most trees made remarkable growth considering the amount of wood injury sustained during the week of January 14th in 1957. This year growers should head back the tall peach trees and prune to replace the winter injured wood.

Tall peach trees are kept at the desired height by heading back upright branches to an outward growing lateral branch.

In the future probably considerable limb breakage will occur on trees having winter injured branches, unless they are replaced by new wood. Well placed branches on the inner parts of the tree should be retained so that they will subsequently replace older wood. Some of the scaffold branches on the bearing trees should be headed back into 2 and 3 year old wood. These branches should be headed to a desirable outward growing lateral. This process will reduce the length of the scaffold limbs and their future fruit load and lessen the chances of scaffold limb breakage.

---W. J. Lord

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BLUEBERRIES IN THE WEST

The cultivated blueberry industry of the far west has developed principally in the coastal regions of Washington and Oregon, west of the Cascade Range of mountains. In this area the climate is quite favorable; plenty of rain, enough cold to satisfy winter chilling requirements without excessive cold, favorable summer temperature without excessive heat, and good soil. East of the mountains the rainfall is so light that the region is totally unsuited to fruit crops, except in a few scattered areas where irrigation is possible and practical.

In spite of the favorable conditions, the blueberry industry has been slow in developing. The chief reason given for this is the lack of good markets. It is said that consumers on the west coast are not so accustomed to eating blueberries as those in the northeast are. One sign of this is the kind of pie available in restaurants. One seldom finds blueberry pie. On the other hand, strawberry or "berry" - it may be boysenberry, loganberry or blackberry - are offered in almost every restaurant.

Another difficulty is the scarcity of large markets in the northwest. Population density is far less than in the northeast. Aside from Portland and Seattle, there are few large population centers. This means that for any large volume of berries markets must be found in California or elsewhere. Nevertheless, there are several hundred acres being grown and the industry is expanding slowly.

Because of the heavy rainfall, 80-100 inches, diseases are more important than insects. A Botrytis which causes shoot dieback is one of their worst troubles. On the other hand, mummy berry is unknown.

One grower in the Puyallup, Washington, area has been unusually successful. He had 19 acres set to a considerable number of varieties. The soil and climate are so favorable that all varieties appear outstandingly vigorous and productive.

Even such varieties as Concord and Scammell, which were erratic performers here, are vigorous, heavy producers there.

In California the blueberry situation is quite different. Very few are grown at the present time. The principal reason for this appears to be lack of interest in this fruit. While much of California's soil and climate are not suited to blueberry growing, there are sizeable areas where, with a little help in the way of irrigation and special soil treatments, considerable quantities of blueberries could be grown.

The slow development of the blueberry industry up and down the west coast is at least partly the result of the intense interest in other small fruits. All three coastal states are heavy producers of strawberries. California is also a heavy producer of boysenberries, loganberries, and trailing blackberries. Washington and Oregon are heavy producers of raspberries and trailing blackberries. These industries are so large and so well developed that, unless there is some sudden change, blueberry growing will continue to expand slowly. The increased production will probably be consumed in local markets. Therefore, eastern growers will not need to worry about shipments from the far west for quite a number of years.

---John S. Bailey

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NOTES ON STRAWBERRIES

The following remarks are based on field observations made last summer:

Virus-free Midland strawberry plants look promising on some farms. On other farms, however, the variety does not make enough runner plants. Several growers reported that Midland has a long picking season. A grower desiring an early ripening variety should plant Midland on a trial basis to determine its suitability under his conditions. This should be the case with any variety because variety performance differs considerably from farm to farm in a locality and from site to site on a farm.

Virus-free Robinson's make abundant runner plants, in fact, on most farms where spacing of daughter plants is not practiced, the plants are too thick! The dense stand of plants favor gray-mold rot. Growers should set Robinson's at least 24 inches apart in the row, cut excess runner plants after the desired row width has been obtained and remove excess runner plants in the row.

Growers selling their strawberry crop by the "Pick Your Own" method should either increase the planting distance between rows or narrow the plant rows in order to provide ample walking space for customers.

June Yellows which was seen in many strawberry beds last spring is not an infectious disease but is due to a hereditary factor or character present in certain varieties. Normal plants of susceptible varieties like Howard 17 possess the character for yellowing and there is no way to predict when a plant or its offsprings will turn yellow.

---W. J. Lord

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POMOLOGICAL PARAGRAPHS

Subsequent Pruning of Young Apple Trees After Framework has been Established.

If the orchardist has faithfully pruned his young apple trees during the first three or four years of growth, the tree's framework should be in most instances well established. Subsequent pruning until bearing should be light mainly consisting of the removal of any wood that begins to compete with the scaffolds or leader. No more cutting should be done than is necessary to keep the selected framework of the tree developing properly. The orchardist should not be concerned with the small shoots and spur-like growths on the older parts of the trees, small lateral branches between the scaffolds or a limb that is too low. These may be gradually removed after the trees begin to bear; until then the surplus branches contribute to the total leaf surface on the tree.

Repair Mouse Damage!

At the County Fruit Commodity Committee Meetings last fall, some of the growers stated that rodent control was their number one cultural problem in apple orchards. It is realized that the goal of the fruit growers should be the prevention of mouse injury but once it has occurred the injury should be repaired! Any tree that has the bark removed from a quarter of the way around the trunk should be repaired. There have been thousands of fruit trees completely or partially girdled in the last few years. On the otherhand, a large number of these trees have not been repaired. Apparently too many growers are failing to examine their fruit trees for sign of mouse injury or are ignoring it. If it was worth the time and money to grow the fruit trees, it should be worth the effort to repair them.

As soon as the snow disappears in the spring the trees should be examined for signs of mouse injury. By this early attention, the grower will have ample time to secure the scions for bridge grafting or the small seedling trees for in-arching.

Rotary Mower - Shredders

Many Massachusetts fruit growers report favorably on the use of rotary mower - shredders for shredding prunings and mowing in orchards. For cutting the prunings, generally the brush is thrown out into the aisles between the trees and the limbs over 2½ inches in diameter are hauled away. High windrows of brush cause difficulty.

The number of times the mower is run over the brush depends upon the amount. The first time over the tractor is driven slowly. Each time thereafter the forward speed is increased and the cutter is set closer and closer to the ground.

The "leavings" in the orchard after the use of rotary mower-shredders on prunings have worried some growers who have not used these machines. In orchards where a good job of cutting has been done the "leavings" present no difficulty. The grass growth quickly covers the shredded brush and it is soon out of sight. The majority of growers mow the grass with a rotary mower-shredder which further cuts the prunings into smaller pieces

Rotary mower-shredders have been used by growers to cut brush and small trees on land being prepared for an orchard. One grower reports that oak, maple and birch trees ten feet in height can be knocked down and cut into small pieces by a mower-shredder.

--- W. J. Lord

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BEWARE! San Jose Scale

The threat posed by this insect should not be shrugged off! San Jose Scale is weakening and killing twigs and branches - even entire trees. Apples with tiny, round scales or the red spots left where the insects settled and fed are being found in more and more boxes. Growers and official workers in adjacent states also report unexpected infestations. Scale-marked fruit is down-graded for local sales and may be refused for export.

Why is this scale threatening to become an important pest again?

Undoubtedly the upsurge in numbers of San Jose Scale has resulted from the cumulative effect of several factors. The switch from lime sulfur to mild sulfurs and then to the organics; a change to less frequent applications of oil; methoxychlor and dieldrin in post-bloom sprays rather than sulfur-lead or DDT-lead; a natural or possibly an insecticide-caused upset in the parasite-host relationship; the series of mild winters (prior to 1956-57) and relatively warm summers (except 1956) extending from the late 1940's -- all of these added to other unknown influences, have brought about the present situation.

San Jose Scale has a tremendous potential for reproduction. Each overwintering female may give birth to 400 tiny living young. These latter scatter widely over the tree making it difficult to attain 100% kill with any material. From three to four generations occur each year. Infestations on wild fruit trees and other woody plants are spread into orchards by wind, birds, etc. Overwintering stages are found all over the bark, some well protected by flakes of loose bark or other cover.

Apple growers are urged to give full attention to the control of this scale during 1958 and the next two or three years. If already known to infest any block an oil application seems essential. Since a complete clean up from one treatment is not expected, other measures should supplement the oil spray. A dormant DN application could be one of these and would be especially useful on aphid-susceptible varieties. Both oil and DN should be applied in dilute sprays to obtain the overall washing-drenching effect so necessary to get complete coverage of scale-infested bark on trunks, larger limbs and even some spots on smaller branches.

Summer sprays containing DDT or any one of the phosphates should be effective against young active "crawlers". These appear first soon after bloom and then again at intervals of about 4 weeks. However, it is extremely difficult to obtain spray coverage in summer applications which is good enough to give adequate kill. There are thousands, even hundreds of thousands, of these tiny crawlers on fruit, leaves, new and old twig growth and branches. We must put our greatest reliance upon delayed dormant oils and dormant DN's.

A program of oil, once every three years, would seem logical and adequate in orchards where San Jose Scale is not noticeable now. This action, if thoroughly carried out, might well serve to hold in check an incipient outbreak.

---E. H. Wheeler

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CONTROL OF FUSICOCCUM PEACH CANKER

Two major infection periods are recognized in the life cycle of the pathogen: (1) Autumn season infections of buds of current season's growth; (2) Spring season infections of leaf cluster buds, basal portion of axillary shoots and leaf blades. Autumn season infections occur in rain periods from September to the onset of cold weather, and the earliest cankers appear in October and they continue to appear, with the advance of the fungus from infected buds into the bark about the nodes, throughout the winter, early spring and through the blooming period. These cankers provide most of the conidiospores for the spring season infection phase which occurs after the dormant season and in rain periods. Disease from these infections appear in May and June, such as dead leaf clusters and axillary shoots, basal shoot cankers and leaf spots.

A tight protectant spray schedule covering the two infection periods has given good control of the disease. The protectant schedule is started in September after Golden Jubilee harvest, and is continued at 10-12 day intervals or in advance of rain periods using a mixture of 1/4 lb. of Dichlone, 1 1/2 lbs. of Ferbam, and 3/4 pint of Glyodin to 100 gallons of water. Glyodin is added as a spreader. Good coverage of buds is important. Captan and Thiram are also effective. Final application is made when 90 per cent of the leaves have fallen. For this last application use liquid lime sulfur (7 gals.) and 3/4 pint of Glyodin to 100 gals. water.

The lime sulfur-Glyodin is repeated at late dormant in the following spring season. It is followed by applications of Dichlone- Ferbam at full pink, calyx and shuck fall, coinciding with the schedule for the control of early brown rot.

In addition to thorough protectant spraying, pruning in June in addition to dormant pruning is most desirable as a sanitary control measure. The orchard should be sown to a thick stand of cover crop in early July to soften the effect of heavy late season rains on growth.

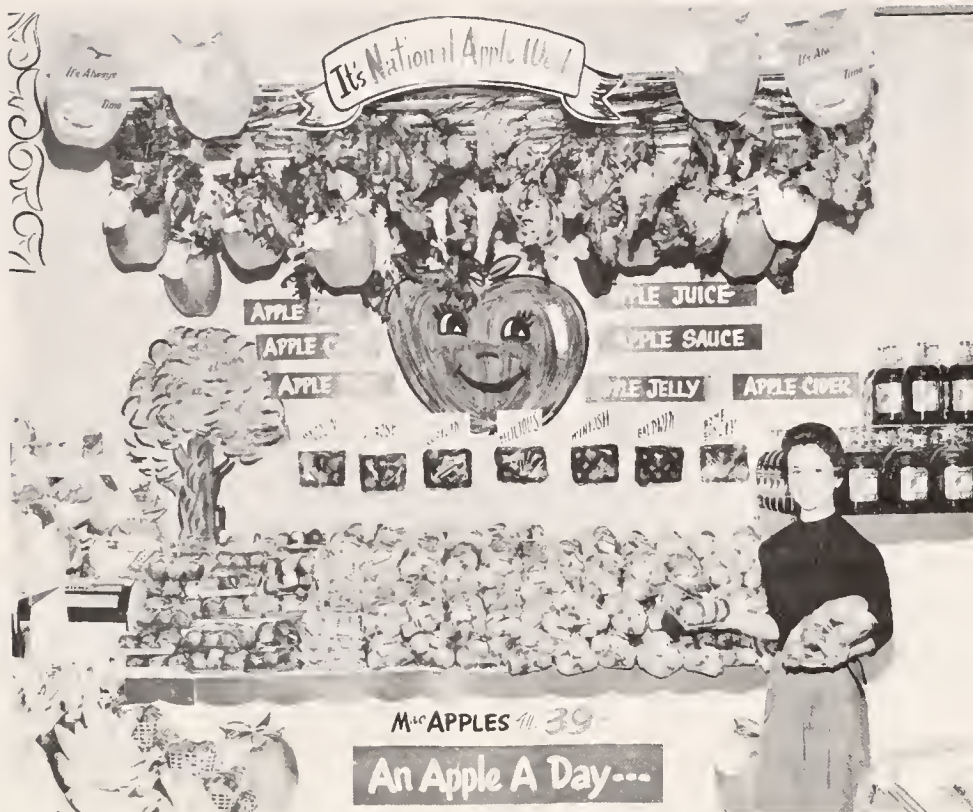
The Fusicoccum pathogen is a wound parasite. Over 90 per cent of the cankers on water sprouts and terminals are distributed among the nodes in the distal half of the latest growth. Of this percent, between 60 and 70 percent of the cankers are distributed in the last quarter or 3/4 - 4/4 of the latest season's growth.

A good spreader-sticker in the fungicide schedule is important. The buds must be well protected periodically as they swell late in the growing season and as the bud scales are pushed away.

The program is costly. A badly diseased orchard can be rehabilitated in 3 years on the basis of our experience.

---E. F. Guba

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Apple Display in Dave's Food Town which won first prize
for food stores in the Hampden County Fruit Growers'
Association Store Display Contest
Shown in picture is Mrs. David Levi, wife of store owner.

FRUIT PROMOTION IN HAMPDEN COUNTY

Because of an exceptionally good crop of high grade apples in Hampden County this season, growers were faced with the problem of selling the crop without dumping them on the market and thus causing a downward trend in price. Directors of the Fruit Growers' Association with help from the Extension Service, set up and operated a booth at the Massachusetts Building during the Eastern States Exposition, September 14 - 22. Extra fancy apples were attractively displayed and on sale both individually and in 3 pound bags. Certified cider was sold by the cup, quart or gallon. The booth was exceedingly well patronized by the public, surpassing expectations.

In October Harry Watling USDA agent, convinced the directors of the Hampden County Fruit Growers' Association that a Store Display Contest would pay off as an additional form of advertising. The growers decided to offer two \$50. prizes for the best apple display, one for food stores and one for non-food stores, shown from November 8 - 16. Letters with return cards were sent out to all independent retail stores in a Chamber of Commerce letter. Chain stores were contacted by individual letters to the area managers. As a result, sixteen stores entered the contest. Some very fine displays were judged by an impartial team of judges. The two \$50. prizes were awarded at the Annual Dinner Meeting of the Association on November 21, to Dave's Food Town on Belmont Avenue in Springfield, and Valley Cinema Incorporated on State Street, Springfield.

Two television appearances were arranged, one for October 25th on Kitty Broman's afternoon show, and one for November 6, on Tom Colton's "Western Massachusetts Highlights", an evening show. President of the Association, Dorrance Green and Associate County Agent Everett Wilder appeared on the afternoon show. President Green and State Association President Jesse Rice appeared on the evening show. Apple varieties and their best uses were explained to the public and displays of extra fancy apples and certified cider were shown.

A local television station offered fancy packs of 100 McIntosh apples as gift packs in a survey to determine the number of its viewers. For two weeks apples were advertised many times a day between programs. The apples were furnished by the fruit growers of Western Massachusetts. Hampden County's share in this advertising gimmick was 65 packs.

Apples were featured in the Greater Springfield Chamber of Commerce breakfast on November 6. Fresh cider and baked apples were featured on the menu. Two hundred and ninety-four persons attended and received 5 pound bags of extra fancy Hampden County grown apples as they left the breakfast room.

In all these forms of advertising, thousands of people in Hampden County felt the impact of this extra promotion of apples. Many more apples were sold because of this extra effort in keeping the buying public aware of this splendid fruit.

--G. Everett Wilder

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One Reason For Low Prices

A rather significant item in a recent issue of "Produce News" is as follows: "The Hudson Valley still has innumerable grading packages, varieties and sizes which works to keep prices down. As long as everything is non-standardized, the only thing a buyer can do is to be very careful. Or, to phrase it another way, not pay much for the fruit."

This comment could apply to Massachusetts just as much as to the Hudson Valley.

---O. C. Roberts

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1958 FERTILIZER RECOMMENDATIONS

Prospects for a heavy bloom in 1958 are not too likely following the large crop in 1957. With most orchards having a light to medium bloom this season, it will be desirable to provide normal rates of nitrogen to aid in obtaining a good fruit set. The following table gives suggested amounts of fertilizer to apply.

Suggested Rates of Fertilizer for Bearing Apple Orchards

Potential bushel yield of tree	Approximate Amounts per Tree					
	Nitrogen required	Potash required	Ammonium Nitrate	Muriate of Potash or 0-15-30		8-16-16
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Less than 15	0.66	1.3	2.0	2.1	4.3	8
15 - 25	0.66-1.00	1.3-2.0	2.0-3.0	2.1-3.3	4.3-6.6	8 - 12
More than 25	1.33-2.00	2.7-4.3	4.0-6.0	4.5-7.1	9.0-14.3	16 - 25

The suggested amounts of materials to apply in the table are for band applications under the spread of the branches. When the materials are broadcast over the entire orchard floor it may be necessary to increase the rate of application in order to obtain the same tree response as with the band applications. Fertilizer materials other than those given in the tables may be used so long as they are applied at rates which provide equivalent amounts of nitrogen and potassium.

The tree's magnesium and calcium requirements can best be met by maintaining an adequate dolomitic liming program. The pH of orchard soils should be maintained between 6 and 6.5. If a soil test shows that the pH of the soil is 5.5 or below, magnesium sulfate sprays should be applied to prevent possible occurrence of magnesium deficiency. It takes from 3 to 5 years before dolomitic limestone is effective in correcting magnesium deficiency. When magnesium sulfate sprays are used apply 2 to 3 sprays of epsom salts at the rate of 20 pounds per 100 gallons of water. These sprays should be timed by calyx, first, and second cover sprays. To avoid possible incompatibilities the epsom salt sprays should not be combined with the regular insecticidal and fungicidal sprays.

Boron should be applied to orchard soils every three years. Borax is the most common material used. The rates of application per tree vary with age and size. Apply one quarter pound of borax to young trees, one-half to three-quarters pound to medium age and size trees, and three-quarters to one pound to large or mature trees. In no case should the rate of one application of borax exceed 50 pounds per acre. Boron may be applied as a foliar spray on a trial basis. Polybor-2 or Boro Spray applied at 1/2 pound per 100 gallons of spray one and three weeks after petal fall have given satisfactory results in New York State.

The amounts of fertilizer applied to trees which have received annual applications of 200 pounds or more of hay mulch per tree may be materially reduced or entirely eliminated. Tree performance should serve as a guide in determining the extent to which the rates of fertilizer may be reduced.

In young non-bearing orchards it may be possible to produce sufficient high quality mulching material for the young trees by broadcasting 500 to 800 pounds of mixed fertilizer per acre. Place the mulch in a band under the spread of the branches. The amount of fertilizer required for the trees with this system of culture will vary with the quantity and quality of mulch applied around each tree. If the trees are not making sufficient growth one-eighth pound of ammonium nitrate per year of tree age may be applied to the mulch.

Recommendations for fertilizing peach orchards are given in the following table. The amounts given may need to be increased if the trees are in a heavy sod. A suggested increase would be to double the amount of nitrogen.

Suggested Rates of Fertilizer for Bearing Peach Orchards

Tree Age	Approximate amounts per tree			
	Ammonium Nitrate	+ Muriate of Potash	or	0-15-30
	Pounds	Pounds		Pounds
3 - 6	$\frac{1}{2}$ -1	1-2		2-4
6 - 9	1 -1 $\frac{1}{2}$	2-3		4-6
9 - 12	1 $\frac{1}{2}$ -2	3-4		6-8
12 & over	2 -4	4-8		8-16

---W. D. Weeks

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HOW GROWERS CAN HELP THE EXTENSION SERVICE

The Extension Service both at the County and State level supplies up-to-date and timely information to farmers but to make the service most effective it must not be a one way road. Growers can help the Extension Service to effectively fulfill its obligation by: (1) reporting the occurrence of orchard pests, nutritional difficulties or physiological disorders and (2) by making the Fruit Industry needs known.

Fruit growers are in their orchards, packing sheds or storages every day while on the other hand the County Agent due to other commitments cannot visit fruit growers daily. Thereby, the grower can help the County Agent and his fellow growers by reporting early, unusual or severe outbreaks of some orchard pest. For example, the County Agent may be working in the northern part of his County while a grower in the southern part may observe the first indication of scab. This information reported to the County Agent would be of benefit. Reporting the occurrence of boron or magnesium deficiency, unusual amount of internal breakdown of apples in storage, etc. are all examples of useful information. It should be remembered that in most instances a particular problem is not restricted to one farm. Although sometimes it makes a fellow wonder if this is so!

How can the Extension Service know it is meeting the needs of the Fruit Industry if growers fail to participate in the County Fruit Commodity Meetings? Some growers may have the attitude that the County and State Fruit Programs are based entirely on the suggestions of the County Agents and the State Specialists. Nothing can be further from the truth as evidenced by some of the objectives of the 1957-58 State Fruit Program stated below. These were included in the State and County Fruit Programs as a result of grower suggestions at the County Fruit Commodity Meetings held last November.

1. Conduct a two day pruning school in Middlesex County with County Agents and growers from other Counties invited.
2. Supply information about airplane dusting to control diseases and insects.

3. Tour apple packing sheds of dealers handling large volumes of fruit
4. Emphasize two-spotted mite control.
5. More specific attention to methods for obtaining adequate spray coverage with air-blast sprayers.
6. Supply up-to-date material on CA storage construction and management.
7. Stress importance of good soil management practices for tree and small fruits.
8. Supply information on irrigation of tree and small fruits.
9. Increase the scope of material included in the Preharvest Drop Control circular.

---W. J. Lord

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FRUIT NOTES

MARCH 3, 1958

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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POINTED POINTS ABOUT INSECTS AND MITES

How much oil should be used in each 100 gallons of dilute spray? This question is being raised because of statements in the Spray Chart: "'Superior' oil ('tank-mixed') 2 gals. OR Prepared 'Superior' oil 2½ - 3 gals."

Any prepared oil known to form a quick-breaking emulsion in water and therefore with depositing characteristics similar to that of "tank-mixed" oil, when used at 2 gallons, should provide adequate kill of red mite and San Jose scale.

Obtain assurance from you supplier that his product is of that type. There are on the market some miscible and self-emulsifying oils that form slow-breaking emulsions. A higher concentration of these is required to obtain an oil deposit or a kill equal to that obtained with the "quick-breaking" type.

* * * * *

Everywhere I go the happiest fruit growers are fellows who don't have any trouble with mites.

How do they get that way? It's a combination of attitude and action! These growers just assume there are mites there to give them trouble if nothing is done about it or if control measures are put off until later.

So these happy growers plan a complete suppression program from early to late. And then they carry out the planned program exactly or with minor variations to take advantage of certain desirable "fringe" benefits when other problems arise.

There is no better way to assure yourself of freedom from damage by red mite in June and by 2-spotted mite in July or August or later. A variety of materials and programs are discussed in the Spray Charts. Plan a way to keep ahead of mites.

Oh yes! These same happy growers are the ones who continually adjust their equipment and speed through the orchard so as to get the good coverage necessary for good insect and mite control.

They know what they are doing! You will be happier if you do too!

* * * * *

Many peach trees have wounds from one cause or another on limbs and branches and the lesser peach tree borer moth is attracted to such places for egg laying. These borers can shorten tree life seriously.

The organic phosphates are most effective against this insect and also the regular peach tree borer. That is why we like to recommend organic phosphates on peaches in post-bloom sprays.

Applications of a residual type phosphate (not TEPP or Phosdrin) June 20-25 and again 3 weeks later will be well timed for the lesser borer and early activities of the regular peach tree borer. The degree of control however, will depend to some extent upon how well the bark of limbs and branches is drenched.

* * * * *

Burn those galls (swellings) you are finding as the blueberries are pruned.

The maggots or larvae of a tiny wasp are overwintering in those galls. If you simply drop them on the ground or a brush heap the wasps will emerge next summer and come right back into your planting to lay eggs.

Result? More galls!

* * * * *

Home orchardists should plan to apply a dormant oil spray this year! San Jose scale is being found in increasing numbers. It kills twigs, branches and even trees. The "General-purpose" spray and dust materials and schedules are not good enough to handle this particular scale.

A dormant oil spray on all backyard fruit trees, especially apples and pears, should be a "must" operation this year - and for good measure - next year too. Don't miss any part of the bark!

---E. H. Wheeler

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PEACH BUDS UNUSUALLY HARDY IN 1958

Much to the amazement of the writer, peach buds withstood the -16°F temperature which occurred in the University peach orchard on February 18. In most years a temperature of -16°F. would be expected to kill practically all peach buds. However, a check of approximately 200 fruit buds showed the per cent of live buds for each of the following varieties to be Elberta 75%, Redhaven 78%, Golden Jubilee 80% and Halehaven 56%. It is most unusual for Elberta to have 75% of its buds alive after a -16°F temperature. The Halehaven trees are located at a lower elevation than the Elberta trees and probably were subjected to a temperature a few degrees below that for Elberta. This could account for the greater degree of killing with Halehaven.

The factors responsible for the remarkable hardiness exhibited by peaches this winter probably started last year. These trees were without a crop last summer and they were not pruned because of the wood injury which occurred in the sub zero temperatures of January, 1957. Past experience has shown that peach trees which have had a heavy crop will not have as many fruit buds survive severe winter temperatures as trees with light to medium crops.

Another factor in the hardiness of peach buds this winter was the temperatures which occurred prior to the extreme cold of February 18. For 10 days to two weeks the temperature did not get above freezing. This long cold spell conditioned the peach buds so that they were at their maximum hardiness. On the other hand if the temperatures prior to February 18 had been considerably above freezing the peach buds would have lost considerable hardiness and it is doubtful if any buds would have survived the -16°F temperature. Thus it appears that conditions were most favorable for maximum hardiness of peach buds in 1958. It is doubtful if commercial peach orchards in the State had lower temperatures than what occurred in the University orchard, so we can expect a peach crop providing we do not get any

more sub zero temperatures.

---W. D. Weeks

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BLUEBERRY NUTRITION - A PROGRESS REPORT

The fertilizing of cultivated blueberries has followed a pattern similar to that which has characterized many other fruits in their early history. It was feared that too much fertilizer, particularly nitrogen, would do more harm than good. As a result, early fertilizer applications were relatively light. These have been gradually increased until rather large amounts are being recommended and used by some growers, amounts which supply 100 or more pounds of actual nitrogen per acre. How much is safe and economical to use?

Cultivated blueberries appear to respond readily to applications of nitrogen. What their response is to other major elements is uncertain. In New Jersey there seemed to be a response to applications of phosphorous. The results of leaf analysis both in Massachusetts and in Michigan suggest that the cultivated blueberry needs very little phosphorous. The situation as regards potash is still uncertain. Results from Michigan indicate no relation between amount of leaf potash and yield.

To get more information about the fertilizer need of cultivated blueberries, an experiment was set up in a growers field in the spring of 1956. Nitrogen is applied as ammonium sulfate at the rate of 1/2, 1 and 2 pounds per bush. Sul-Po-Mg is used to supply both potash and magnesium because the use of potash alone might result in a magnesium deficiency. The rate is 0, 1/2 and 1 pound per bush. These are being used in all possible combinations, this giving nine different treatments. All fertilizer is spread at one time, just before bloom.

In 1956, all plots were fertilized alike with a complete fertilizer so that yield records of the plots could be obtained before the differential fertilizer treatments were made. Each summer yields are obtained and leaf samples for chemical analysis are collected from all the plots.

The rates of fertilizer application, especially nitrogen, are high. These high rates were considered advisable because the bushes were in a low state of vigor and because it was desired to find the upper limit of amounts which could be used without injury.

In 1957, the differences in yields between plots were not significant. This is not surprising when one remembers that the fruit buds for the 1957 crop were formed in the summer of 1956 before differential fertilization started. On the other hand, the growth response of the bushes has been very marked. All the bushes have been stimulated into increase growth which appears to be roughly in proportion to the nitrogen applied. When 2 pounds per bush of ammonium sulfate was used, considerable late growth resulted, growth which was quite immature at leaf fall and which will probably be injured if very low temperatures occur. It looks as if the limit of safety has been exceeded. This is not surprising since 2 pounds per bush would be

equivalent to about 440 pounds of actual nitrogen per acre. Perhaps over a period of several years, even 1 pound per bush may be excessive. To date there has been no observable response to the Sul-Po-Mg applications.

Leaves of some Rubel bushes were collected semi-monthly through the summer and analysed chemically. Leaf nitrogen was very high in late May. It dropped very rapidly to mid-July and then dropped very slowly till mid-September.

It is too soon to draw any conclusions from this experiment.

---John S. Bailey
Bertram Gersten
A. F. Spelman.

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SALES GIMMICKS

Many people enjoy obtaining branches of forsythia and pussy willows during February and forcing them to flower by placing the stems in water at room temperature. Apples, peaches, pears, plums and cherries also can be forced into flower in February and March. One Massachusetts fruit grower takes advantage of this by using prunings as a sales gimmick at his roadside stand. In advertising, he mentions that branches of fruit trees for forcing or which have been forced can be obtained at his roadside stand.

Customers are charged for the branches that have been forced by the grower; branches that have not are free of charge. Prior to Christmas, the same grower has boughs of evergreentrees which are available free of charge.

Salesmanship like that mentioned above brings customers!

---W. J. Lord

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HINTS ON CONTROLLING WOODCHUCKS IN ORCHARDS

When woodchucks emerge from hibernation, they sometimes seriously damage fruit trees by chewing the trunk. However, it is believed that the purpose of this gnawing is to exercise or wear down the teeth rather than to consume the bark as food. The most serious economic damage to fruit trees results from an annoying habit that chucks have of digging extensive burrow systems under fruit trees. This excavating often exposes the roots, causing them to dry out and in extreme cases may result in killing the tree. The burrow system also encourages mice by providing excellent harborage, as well as a readily-available food supply in the form of exposed roots. The combination of rootlets drying out and mouse damage to the root system reduces tree vigor, growth, and fruit production.

Damage to farm equipment such as breaking or dulling of mowing machine blades should not be minimized. Also, these holes are trips for catching wheels and causing equipment to get stuck or even overturned.

This damage which is indirectly caused by woodchucks can be prevented by an early inspection of your orchard about April. Freshly excavated soil at the burrow opening is a positive indication of recent activity. Only active burrows should be treated. The Gas Cartridge is the easiest and most effective means of eliminating these rodents and the best time to use the cartridge is before the young have left the burrow. It is equally important to attain good peripheral control in hedgerows, woodlands, and brushy areas bordering your orchard; this will keep migrants, who reside in these adjacent areas, from moving into your orchard. Gas Cartridges may not be so effective where burrows are hidden in stonewalls, under outbuildings, and in other inaccessible places. In cases like these, trapping or shooting is the best solution. A No. 2 Trap is a must and we recommend a coil-spring type because it catches the chuck high on the leg and prevents him from twisting or pulling out. Traps should be set in a burrow opening or in a travel lane and should be somewhat concealed. Shooting shouldn't be discounted as a control method, especially if the owners or neighbors enjoy this sport.

The following facts are set forth to dispel some common misconceptions relative to controlling woodchucks: (1) There is usually only one woodchuck to each burrow but they are polygamous and visit frequently, especially during the mating season; (2) Wandering chucks and other burrowing animals (especially skunks) will set up housekeeping in a burrow that has been gassed and filled in, giving people the erroneous impression that the original occupant was not eliminated. This is also the reason why perimeter control is so important; (3) There is very little danger in handling Gas Cartridges if the directions are followed. They do not explode--they merely burn with great intensity and in so doing give off a poisonous gas.

Gas Cartridges may be purchased through most farm cooperatives, garden and hardware supply stores, or directly from the Rodent Control Fund, University of Massachusetts, Liberal Arts Annex, Amherst, Massachusetts. When purchased from the Rodent Control Fund, the current price, f.o.b. Amherst, is: 7 1/4 cents each for orders of 200 or more; 9 cents each for orders of less than 200.

If control measures are carried out according to our recommendations, regarding proper time and the method employed, woodchuck control can be accomplished at a minimum expense and with very little effort.

---John W. Peterson

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RESULTS OF THE APPLE ORCHARD IRRIGATION EXPERIMENT IN 1957

In 1956 an apple orchard irrigation experiment was undertaken in South Amherst, Massachusetts to learn more about the irrigation needs of our Massachusetts orchards.

The objects of the experiment are as follows: (1) to determine how many years out of 10, apple trees on the experimental site suffer for lack of water, (2) to study the effect of water shortage on the growth of trees, fruit growth, color, quality and yield of fruit, (3) to determine at what percentage of available soil moisture irrigation water should be applied and (4) to find how the nutritional status of the fruit trees is effected by irrigation.

On May 25, 1956, a frost killed 95% of the blossoms and therefore the trees were not irrigated. However, in May, 1957, the trees had a snow-ball bloom and a large potential crop. During June, 1957, 5.7 inches of rain were recorded with 1.4 inches on the 19th and 3.09 inches from the 26th through the 30th. However, only 1.38 inches were recorded in July and 0.84 inches in August. Many parts of the State were not so fortunate receiving little or no rain during June. The summer of 1957 at Boston, based on the June, July and August period, was the driest in 140 years of official and unofficial records. Total rainfall was but 3.97 inches, only 40% of the 3 month normal of 9.89.

Yield and Fruit Size

The fruit on the irrigated and non-irrigated trees grew approximately at the same rate until after July 23rd which is 7 days after the date of the first irrigation during which 3 inches of water was applied. Water was again applied on August 22. Due to the slow development of red color the fruit was "spot-picked" on September 17th and 18th and picked clean on September 23rd. The average yield for the irrigated trees was 29.6 bushels and that for the non-irrigated trees 25.9 bushels. A greater difference in yield might have occurred except for the fact that the irrigated apple trees were slightly smaller in size. Fruit drop was recorded but no difference existed between the irrigated and non-irrigated trees.

On the day the fruit was picked clean, water core was noted in some of the fruit on the irrigated trees. Approximately 15 per cent of the fruits from the irrigated trees had water core and only 1 per cent of those from non-irrigated trees.

At harvest 4 bushels of apples were selected from each tree to determine the average number of fruits required to make a bushel. The average number of fruits per bushel from the irrigated trees was 126 as compared to 170 fruits per bushel from the non-irrigated trees. It took 44 less apples from the irrigated trees to fill a bushel.

Table 1 shows approximately 91% of the fruits from the irrigated trees were greater than 2 1/2 inches in diameter as compared to 54% from the non-irrigated. By count, 206 apples from the 7 bushels graded from the irrigated trees were 3 inches or greater in diameter. Only 8 three inch apples were harvested from a similar volume of non-irrigated fruit.

Table I - Percentage of Various Size Apples of the Fruit Sampled from Irrigated and Non-Irrigated McIntosh Trees, 1957.

Fruit Diameter	Irrigated Fruit	Non-Irrigated Fruit
inches	per cent	per cent
2 - 2 1/4	3.7	19.2
2 1/4- 2 1/2	5.2	27.2
2 1/2- 2 3/4	24.2	39.9
2 3/4- 3	42.5	14.0
3 or more	24.5	0.6

Leaf Analyses

Leaf samples were taken prior to the first irrigation and on August 27th after the second irrigation to determine the nitrogen, phosphorous, potassium calcium and magnesium content of the foliage. The leaf analyses showed that irrigation had no effect on nutritional level.

Fruit Color and Flesh Firmness

Table II shows that the percentage of apples from the irrigated trees meeting the color requirement for U. S. Extra Fancy was twice that from the non-irrigated trees. The quality of color was superior on the fruit from the irrigated trees, being a brighter red. In addition, the ground color on the irrigated apples was distinctly more yellow than on the non-irrigated fruit.

Table II - Percentage of McIntosh Apples Sampled from Irrigated and Non-Irrigated Trees Meeting the Color Requirement for Various U. S. Grades, 1957.

Grade	Irrigated Fruit	Non-Irrigated Fruit
U. S. No. 1	6.6	12.3
U. S. Fancy	36.3	58.3
U. S. Extra Fancy	55.1	22.6

At harvest time, average flesh firmness as determined by a pressure tester was 15.1 for the irrigated apples and 17.7 for the non-irrigated apples. Since much of this difference of flesh firmness could be accounted for by size difference, pressure tests of the stored fruit were made on apples of 2 1/2 to 2 3/4 inch diameter, the results of which are shown in table 3. It will be noted in Table III that when apples of similar size are selected no significant difference in flesh firmness existed between the irrigated and non-irrigated fruits.

Table III - Fruit Flesh-Firmness of Irrigated and Non-Irrigated 2 1/2 to 2 3/4 inch McIntosh Apples, 1957.

Date	Irrigated Fruit	Non-Irrigated Fruit
	pounds	pounds
October 16	12.6	12.6
November 21	11.0	11.3
December 19	10.6	10.9
January 20	10.4	10.8
*January 24	8.4	8.9

*Fruit Held at Room Temperature 3 days

On January 23, pressure tests were taken of a random sample of fruits from the irrigated and non-irrigated apples. Average flesh firmness for the irrigated apples was 9.4 pounds and that of the non-irrigated apples 10.5.

In summary, the experimental results with apple orchard irrigation in 1957 show increased fruit size and improved color from irrigation but on the other hand the fruit was softer and had more water core.

--- W. J. Lord
K. J. Kucinski
B. Gersten

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THE EFFECT OF COLOR ON SALES APPEAL

Recent research studies with McIntosh apples in Massachusetts show conclusively that mechanical injury (bruises and stem punctures) is the principal cause of off-grade apples and insufficient color is second in importance. Insect and disease blemishes are relatively of minor importance due to the splendid job that most growers are doing in controlling orchard pests.

A current investigation indicates that considerable progress is being made in reducing the amount of mechanical injury but persistent effort is necessary on most fruit farms in order to reduce this type of injury to a minimum.

With poor color second in importance as a cause of off grade fruit, practices which tend to improve color need to be emphasized.

The development of apple color has been studied at the West Virginia Agricultural Experiment Station for the past twenty years and in 1956 a special study was made of the effect of color on sales appeal. Results of these studies have been reported in West Virginia Agricultural Experiment Station Bulletin 396.

In their study of the development of color they found that excessive nitrogen often decreases or delays color formation and that in some fertilizer studies potassium has increased red color.

While pruning, thinning, fertilization and stop-drop sprays all have an effect on the development of red color, greatest progress has resulted from the use of color sports of standard varieties.

Clear, sunny, cool days with low humidity help to develop highly colored apples with a bright, lustrous finish while hot days with warm nights and high humidity coupled with fog or cloudiness account for poor color with a dull finish.

The experiment reported in this bulletin included a study of the effect of color on the sale of Rome apples in a chain store in Charleston and Huntington, West Virginia. A comparison was made between the sale of Rome apples in 5 lb. polyethylene bags having 15 percent color and those having 50 percent color. In the stores studied, sales were increased approximately 75 percent by increasing the area of solid red color on the surface of the apples from 15 percent to 50 percent with both lots selling at 5 lbs. for 49 cents. However, sales were reduced approximately 43 percent when the price of the high colored apples was increased from 5 lbs. for 49 cents to 5 lbs. for 69 cents.

---O. C. Roberts

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WATER CORE AND INTERNAL BREAKDOWN

During the 1956-57 season, internal breakdown of Delicious, Rome, and Spy apples was a rather serious problem. At least with Delicious it was known

that much water core existed in the fruit before and at harvest in 1956. It has also been shown that fruits which have had water core are much more susceptible to internal breakdown in storage even though much of the water core may disappear. During the 1957-58 season, several storages had Delicious showing considerable amounts of internal breakdown in January. In practically all cases where this breakdown occurred, water core was also evident. Since there appears to be a close positive correlation between water core and later developing internal breakdown, it appears that a reduction in water core would markedly reduce the susceptibility of apples to internal breakdown.

What is the cause of water core? What factors increase susceptibility? What can be done to reduce its prevalence? Studies on water core have been "few and far between" in the past 25 years. Consequently, ideas on its cause have not been subjected to much recent critical examination or study.

Water core is somewhat of a misnomer since this trouble often exists in tissues beyond the core. It is generally thought that rapid conversion of starch to sugar in the flesh contributes considerably to the development of water core. The marked increase in sugar in some of the cells supposedly causes water to move into these areas, thus raising the pressure within these cells. Eventually, a leakage of the sugar solution into the intercellular spaces occurs and the water-soaked areas develop. Some observations and studies made in Illinois in 1942, however, raise some doubts concerning the above explanation. In these studies, it was found that within a water cored apple the soluble solids content of the water-cored area was often no higher, if as high, as non-water-cored areas. Also, the water-cored areas appeared to be as high or higher in starch than non-water-cored tissues. In view of these findings, it appears that the cause of water core is not fully understood.

There is considerable agreement concerning factors associated with water core. Certainly, there is considerable variation in variety susceptibility. Delicious is very susceptible. Many other varieties may develop water core especially if allowed to become overripe on the tree. Some varieties, such as Delicious, may develop water core before they are overmature as occurred during the 1956 season. With most sorts, however, (including Delicious) it tends to get increasingly severe as the fruit ripens. Large fruit is generally more likely to have water core than small fruit although small apples will often have some. Perhaps the reason for this relationship with fruit size is due in part to the fact that large fruits on any given date are usually riper than small ones. For example, Dr. Lord found in 1957 that a midseason irrigation of McIntosh greatly improved fruit size but accompanying this improved size was hastened fruit ripening and an increase in water core. It would appear that heavy thinning, severe pruning, and a high level of nitrogen fertilization might increase the susceptibility of fruit to water core if these practices increase fruit size and/or the rate of fruit softening. Much has been said about the influence of climatic condition in relation to water core. Past studies of water core indicate that water core is increased by abrupt increases in temperature over the previously prevailing conditions. A heat wave following a period when 70°F. weather prevailed during the latter part of the growing season may increase susceptibility. However, in 1956 when water core was serious we experienced a growing season that was cooler than average. Certainly,

weather conditions have a very important influence of the development of water core, but it is not always clear what the critical climatic factors are and what relationship there is between them and the soil moisture and nutrient supply.

There is no positive control for water core and eventual development of internal breakdown of Delicious. However, there are a few things that one can attempt to do to reduce its severity. These seem to be: (1) Try to reduce the tendency to produce oversize fruit. Oversize fruit always has a shorter storage life and is more susceptible to a wide variety of storage troubles than medium sizes. Such fruit is generally softer and, even in the absence of a visible disorder, do not store well. (2) Pick the fruit before it becomes too mature. We recognize that water core may develop in Delicious even when the fruit is not sufficiently ripe for harvest, but there is little doubt that the riper the fruit becomes the more water core it is apt to have.

It is now obvious that apple storage operators should make more inspections of their fruit throughout the storage season not only to determine the prevalence of internal breakdown but for scald, bitter pit, brown core and other storage disorders. Regular inspections at regular two-or-three-week intervals, starting at about Thanksgiving time, would help to eliminate serious losses late in the storage period. For example, samples of fruit of a susceptible variety should be taken from storage and placed at room temperature for a week, in unsealed poly bags to prevent shriveling to see whether any troubles develop that were not evident in storage. A storage operator who can spot troubles early in the season has some chance of disposing of the fruit before the trouble reaches serious proportions. The person who doesn't keep track of the situation by frequent inspections may eventually have fruit so seriously injured by a storage disorder that much of it is unsalable.

---F. W. Southwick

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FRUIT NOTES

APRIL 18, 1958

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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WHATS HAPPENED IN THE PAST THIRTY YEARS IN THE APPLE INDUSTRY IN NEW HAMPSHIRE

(Editor's Note - This is the first of a series of articles in which Professor E. J. Rasmussen discusses "Whats happened in The Past Thirty Years in the Apple Industry in New Hampshire!")

I came to New Hampshire thirty years ago as a part time Graduate Student and as a pest control specialist on tree fruits. I well remember the first New Hampshire Horticultural Society Meeting I attended. It was in 1927 at the Armory in Manchester. Mr. James Tufts of Exeter was President of the Society and A. J. Farley, Extension Horticulturist of New Jersey was one of the guest speakers. There was a fine apple show in connection with the meetings. W. B. Farmer of Hampton Falls and E. N. Sawyer of Salisbury were competing for the sweepstakes prize. Both exhibitors showed a barrel of Baldwin apples. The apples were so near alike in both barrels that the judge, Dr. R. H. Roberts of Wisconsin, had to remove nearly every apple from both barrels before he could decide the winner. The sweepstakes went to W. B. Farmer.

There was a good deal more interest in fruit shows at that time. Folks took a real pride in exhibiting their fruit and naturally with seventy varieties being grown there was plenty of material from which to choose. As much as eight hundred to one thousand dollars was spent on premiums and expenses for running these shows.

Those first years as Extension Specialist in Pest Control were interesting ones. At that time fruit growers were numerous enough so that Town Fruit Meetings were common. We would have 15 to 20 growers at a meeting in Hancock and 30 to 40 in Wilton, Hollis and Derry. Usually there were four of us, Prof. G. F. Potter, Dr. L. P. Latimer, Mr. H. A. Rollins and myself, on the program. Fred Beane nicknamed us the "four horsemen" and we often rode forth at night.

VARIETIES

The reduction in the number of varieties of apples grown is no doubt the most significant change and had the greatest influence on the industry of any of the changes that occurred in the past thirty years. The 1927 Annual Report of this Society lists grading regulations for 43 striped and red varieties. This does not include the green and yellow and a number of odd varieties.

The following is an excerpt from a letter to H. A. Rollins from William Thies, Extension Horticulturist at Massachusetts dated January 17, 1928. "Believing that seven apple varieties will serve our needs better than seventy the Agricultural Colleges of New England through the Extension Service are cooperating on a better variety campaign program. Seven apple varieties have been selected as especially adapted to New England conditions. These are to be called the New England Seven and are as follows: Baldwin, Delicious, Gravenstein, McIntosh, Northern Spy, Rhode Island Greening and Wealthy. These varieties are the leaders in the New England States. Upon them our reputation as a fruit section depends." Further comments in this letter indicate that the apple industry in New England was on the decline and the better variety campaign was a move to revive the industry. From seventy to seven, that could have been the slogan for the better variety campaign in 1927.

The men who selected the New England Seven did a good job of selecting varieties. Two of these varieties, Delicious and McIntosh are the leading ones today. Delicious is first in production and popularity and McIntosh is first in New England and second in the United States. Baldwin, Rhode Island Greening and Wealthy are no longer being planted. Red Gravenstein and Northern Spy are being planted in a limited way. Cortland, an important variety today, was introduced later and its real value to the industry is as a pollinizer for McIntosh and Delicious. Today the list of varieties could be called the New England Three which include McIntosh, Red Delicious and Cortland.

There is some interest today in planting the new early varieties such as Puritan, Fenton, Mantet, Red Crimson Beauty and Red Melba, especially for roadside stand operators. These early varieties will help to prolong the marketing period for apples.

There is a real need for a winter variety to partly replace McIntosh but at present none of the new varieties appear to be good enough.

The promotion of the better variety campaign which was started in 1926 was quite an undertaking. There were 463 growers in eight counties entered in the program which shows how interested the growers were in this project. In order to promote this better variety program a top grafting contest was started the same year. Three prizes were offered in each of two classes based on the number of trees of odd varieties to be worked over in an individual orchard. The report shows that 35 hundred trees were top grafted the first year of the contest in New Hampshire. The first prize of 50 certified apple trees was won by A. D. Rowe of Stratham. The second prize by Miles Watson of Newington and the third prize went to J. T. Moore of Boscawen. The report also stated that 35 thousand trees were top grafted to better varieties in New England and the majority of the trees were grafted over to the McIntosh variety. There is still evidence of this top grafting contest in many of the old orchards in the state and many of these trees have contributed to the welfare of the industry.

POLLINATION

The reduction in the number of varieties grown brought out the importance of cross-pollination in obtaining a set of fruit. The value of cross-pollination on certain varieties was not recognized in 1927. There were always suitable varieties for pollination in all orchards where so many were grown. The removal of all of the odd varieties and the planting of solid blocks of one variety created a pollination problem, especially with self-sterile varieties such as McIntosh, Delicious, Gravenstein and Northern Spy. The experimental work on pollination of apples at the New Hampshire University by Dr. L. P. Latimer from 1927 to 1933 was the first work to show the value of such varieties as Red Delicious, Wealthy and Wagener as pollinizers for McIntosh and the necessity of interplanting these varieties if good crops were to be produced. Soon after the establishment of the importance of cross-pollination the interplanting of varieties in new plantings became a standard practice.

---E. J. Rasmussen

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Pomological Paragraphs

Recently it was suggested that we add to the fertilizer table for blueberries another column giving costs. This would be a good idea if the value of fertilizer could be judged by cost alone. Of course, it can't. There is a quality factor which is more important than actual price per ton. The cost per unit of nitrogen or phosphorus, or potash, or a combination of these, is more important than the cost per ton. In general, high analysis fertilizers are the least expensive per unit. It is good business to buy fertility as cheaply as possible. Buying the cheapest fertilizer may not yield the cheapest fertility.

---J. S. Bailey

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PREVENTING FROST DAMAGE TO STRAWBERRIES

Late spring frosts have caused considerable damage to strawberry crops in a single night. Growers that irrigate for frost protection report that irrigation means the difference between a good strawberry crop and a near failure.

Frosts generally occur when the earth and surrounding objects reach the temperature of 32° F. or lower. Frosts are usually accompanied by deposition of ice crystals, but temperatures below 32° may occur without formation of ice crystals.

The principle by which water is able to prevent frost injury is based on the latent heat which is released when water is changed to ice. Some heat is released as water is cooled to 32° F., but the main effect is produced when water is changed to ice. When 1,000 gallons of water is changed to ice as much heat is released as when 800 gallons of boiling water is cooled to 32° F. The temperature of any object remains near 32° F. as long as water is freezing on it. When an irrigation system is used for frost protection, water is continuously sprayed on the plants and soil. As the water starts to freeze on the plants, it gives off heat to the strawberry plant leaves and blossoms and to the air and soil. Unless the air temperature is very low or the heat is rapidly removed by a cold wind, the heat absorbed by the plants is sufficient to keep the temperature above freezing. The water should be applied before the air temperature reaches 32° and continuously as long as the air temperature remains below freezing. If sprinkling stops before thawing takes place, the temperature of the wet strawberry blossoms drops rapidly and they will be killed.

A Massachusetts grower reports that irrigation gave complete protection of strawberry plants in 1956 when air temperature dropped to 22 degrees. Reports from other states indicates that growers have been able to protect strawberry plants against temperature as low as 12 degrees.

It was reported in the 84th Annual Report of the State Horticultural Society of Michigan that some Michigan strawberry growers assume that the start of ice crystals is the time to start applying water and that these

growers used various ingenious methods to determine the starting time. The most common method was to observe and feel the formation of ice crystals on the leaves in the lower part of the strawberry field. Other growers parked their cars in a low area and watched for the formation of frost on roof and fenders. One grower used an old car fender placed in the lowest area while another used a very thin layer of water in a pie plate which was set directly on the row. It should be noted, however, although frosts are usually accompanied by deposition of ice crystals, that temperatures below 32° F. may occur without the formation of ice crystals. This condition is known as "black frost" and may result in frozen plants.

To avoid risks thermometers should be used. These should be placed at plant level because temperature here is apt to be several degrees colder than at four or five feet above the ground. The use of temperature - alarm devices can save growers a great deal of sleep.

A sprinkler irrigation system, if properly used is the most effective method known to control, or greatly reduce damage caused by frost. Smudge pots or burning tires work only on those rare nights when atmospheric conditions are just right. In many cases frost protection is obtained for a short distance only from the smudge pots or burning tires.

Irrigation equipment can be placed to cover more area when used for frost protection than when used for irrigation. Many irrigation systems are designed so that water from one sprinkler will reach the base of the next sprinkler. For frost protection, the spacing of the sprinklers can be increased to cover about twice as much area. It is suggested in the Michigan State University Extension Bulletin #327 that for frost protection, the wetted area from one sprinkler should overlap for a few feet the wetted area from the next sprinkler. To distribute the water satisfactorily over a large area sprinklers should be spaced in a triangular pattern instead of a rectangular or square pattern.

Sprinklers with smaller nozzles than those used for protection against drought are more efficient in frost protection, as generally ice is formed more quickly than with large nozzle sprinklers.

The Michigan State University Extension Bulletin gives the following suggestions for using the irrigation equipment:

"The water distribution in the field should be checked to make sure that all the plants are sprinkled with enough water. This can be done by measuring the water depth in several oil cans--with tops cut out--placed midway between two sprinklers, where the water application is likely to be the least. This should be done as a "test run" before the equipment is used for frost protection.

The water application rate for frost protection should be just enough to prevent damage to the plant. Putting on more water than is needed is a waste of water and power, and may lead to waterlogging the soil. A minimum water application rate of about 1/10 to 1/8 of an inch per hour, as measured

in cans between sprinklers in the field, appears to be adequate for a minimum temperature of 20°F.

Most of the rotary irrigation sprinklers used in Michigan, especially those with two or more nozzles, usually apply more water than is needed for frost protection. Some growers plug one nozzle and use only the nozzle with the "kicker arm"; by use of this procedure, usually about half the normal amount of water is applied. It may also be necessary to use a smaller-size sprinkler nozzle to further reduce the application rate. Increasing the pressure at the sprinkler will increase the wetted area and may create finer water droplets, both of which are desirable. Your irrigation equipment dealer can help you select the proper size nozzle and adjust the sprinkler spacing.

The turning and speed of the sprinklers can be an important factor in the effectiveness of irrigation for frost protection. Small, one-nozzle sprinklers turning one revolution in 12-20 seconds have given very satisfactory results; whereas somewhat larger sprinklers with one nozzle plugged, turning one revolution in 90 seconds or more, did not adequately protect a tomato crop against a 24 degree frost. Until further research evidence is available, definite recommendations regarding the turning speed of sprinklers cannot be made. The rotation speed of some sprinklers can be increased by increasing the spring tension or by making other adjustments."

---W. J. Lord

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TIPS ON DETECTING MINERAL DEFICIENCIES OF APPLE TREES

Magnesium and potassium deficiencies are of frequent occurrence in Massachusetts orchards. Both deficiencies are expressed by a scorching of the foliage. Interveinal scorching of the foliage is generally associated with magnesium deficiency while marginal scorching is characteristic of potassium deficiency. However, in many cases interveinal scorching may extend to the margin of the leaf making positive identification of the deficiency difficult or impossible.

A history of the fertilizer program used in the orchard where foliage scorch appears will often aid in determining whether the scorch is due to magnesium or potassium deficiency. For example, if scorched foliage occurs in a block which has not been limed for several years and it has been fertilized with a mixed fertilizer such as 10-10-10 you can be almost certain that the scorched foliage is due to magnesium deficiency. On the otherhand, a block which has been well limed and fertilized with only a nitrogen carrying fertilizer the scorched foliage will be an expression of potassium deficiency. These observations have been verified by chemical analysis data which we have obtained from growers orchards over the past several years.

---W. D. Weeks

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DON'T TAKE A CHANCE WITH APPLE SCAB IN 1958

Dry weather in the spring of 1957 made it an easy year for scab control and most growers had little or no scab on fruit at harvest. Continued dry weather in summer and fall did not favor build-up of leaf scab so that for 1958 the carryover is light.

The question in the mind of nearly every grower is, "With a very light carryover, is it necessary for me to follow a strict protective scab control program or can I take it easy?" Unfortunately, there is no unconditional answer, and, regardless who gives the answer, at best, it can be only a guess. But the chances are that it will be a better guess if there are a few facts on which to base it.

Suppose we start with one scab spot on one leaf on one tree and the leaf drops to the ground. The fungus grows and winters in the leaf but no winter spore cases will develop and produce primary scab spores because the fungus is self-incompatible. But suppose we start with two scab spots on one leaf. The fungus from each grows through the leaf tissue and as the threads from one spot reach those from the other there is union and formation of winter spore cases because threads from different spots are compatible. Winter spore cases can be formed also when two leaves with only one scab spot each are overlapping or in contact with each other on the ground so that fungus threads can grow from one leaf into the other.

It is possible for 250 winter spore cases to be formed on one square inch of one scabby leaf on the ground and it has been calculated that from one square inch of such a leaf more than 33,000 primary spores can be discharged in 45 minutes of wetting. If even a few of these spores land on unprotected leaf tissue or flower clusters, each will produce a scab spot in 12 to 15 days with many spores capable of causing secondary infections and, what is more, each scab spot will continue to produce and scatter spores with each rain the rest of the season unless it is "burned out". And each secondary scab spot will produce more spores in 10 or 12 days. All this from just one discharge and in one primary infection rain. When this is multiplied by several discharges during infection rains, it is obvious that a grower can have a rather heavy scab population going on in his orchard in 20 or 30 days if he neglects his scab control program.

Several years ago Dr. A. B. Burrell of New York, in a talk at the Annual Meeting of the M. F. G. A. reported that it cost more for scab control if there were scab infections on spur leaves or early in the season. He advised early scab control and a strict protectant program through the primary infection period. This is still good advice for Massachusetts growers for 1958 even though there is a light scab carryover.

The fungicides listed in the spray chart will give satisfactory scab control if applied on time and thoroughly. Growers should read about apple powdery mildew on the last page and decide whether to include mildew protection in the early scab sprays or to wait until mildew is found in the orchard.

---C. J. Gilgut

PLASTIC MULCH FOR STRAWBERRIES

While I was in California I visited some strawberry fields where plastic mulch is being tried. Only a few of the many strawberry growers there are trying it. It is still considered in the experimental stage. It is true that during a three weeks rainy period in the early part of the season plastic mulch prevented many berries from rotting (I was assured that such weather was very unusual). In California strawberries are grown by the hill system. This makes it possible to cut holes in the plastic strips and pull the plants through.

In the summer of 1956, a small amount of plastic mulch was donated for trial by one of the manufacturers. I gave some to two growers who use the Cape Cod spaced row system. Both reported that it was almost impossible to set runner plants through the mulch. At the end of the season the runner plants set through the plastic were much smaller than those set without it. I can see no possibility of using plastic mulch where the matted row system is used. Only some type of hill system appears adapted to its use. Climate is also a factor. Plastic mulch appears to be shorter lived in the northeastern states than in California. Even the black mulch, which is most resistant to sunlight, has deteriorated badly in about two years.

Although the results here have not been very encouraging, it is still possible that with changes in the material itself and in methods and practices in strawberry growing, plastic mulch may be useful.

---John S. Bailey

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COMPOSITION OF VERMONT ORCHARDS

A survey of Vermont commercial apple orchards conducted during the 1957 growing season was the first complete survey of this kind. Of the 104 apple plantings surveyed, only 86 are of commercial importance. These 86 orchards involve 3562 acres on which 122,000 trees are being grown. In line with a trend observed from other orcharding states, orchards of 500 trees or less have only 4% of the tree population while even though only 22% of the orchards were above the 2,000 tree size, they included more than 56% of the tree population.

McIntosh is far ahead of any other variety with 64% of the tree population followed by Northern Spy with 12% and Red Delicious with 10%. Cortland is the fourth important variety with only 6%. Greenings are down to 2%. This is the continuation of a definite trend during recent years to fewer varieties. With better than 90% of Vermont's commercial apple trees limited to four varieties, it is not at all surprising that Baldwins, Wealthy, Fameuse and Northwest Greenings are no longer being grown.

Only 12% of the apple trees in the 86 orchards have been planted since 1950 which is a much lower figure than the 20% plus figure generally considered to be necessary to maintain a good strong orchard operation. Addison County, with 38% of the state's apple trees, has 15% of the tree population in the non-bearing age bracket. Bennington County, with 21% of the trees, has only 3% in the young bracket. Windham County, which is the third important apple growing county, has 23% of the trees in the non-bearing age bracket.

Growers may realize some benefit from the survey by determining the situation in their own orchards as to ratio of non-bearing to over-age trees and also the number of low value trees being grown. The shortcomings of growing an orchard in which a very high number of trees are already in, or soon will be in, the over-age bracket shows up quickly if and when selling the orchard is necessary. An orchard on a good site, made up of the right varieties for the situation and with a favorable ratio of young to full-bearing age trees, is a good proposition both from income and resale value standpoints. A good ratio of young to old trees and high to low value varieties is a form of insurance that an apple grower might like to look into.

---C. Lyman Calahan

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ABOUT INSECTS AND MITES

Revised editions of Disease and Insect Control Charts for Massachusetts are now available in County Extension Offices and the Mailing Room, University of Massachusetts at Amherst.

These charts are designed for commercial growers of Apples, Pears, Peaches, Cultivated Blueberries, Strawberries, and Grapes. They have been developed cooperatively by Extension and Research personnel of the College of Agriculture from the headquarters at Amherst and the Field Stations at Waltham and Wareham.

For Home Orchardists the "General-Purpose" Home Orchard Spray Schedule (Special Circular No. 178) is still available but unchanged. This chart features a mixture of captan, methoxychlor and malathion, a safe, effective combination for use on all home grown fruits.

* * * * *

Strawberry growers planning to use captan in repeated applications from before bloom and all through harvest to control various fruit molds should plan also to control 2-spotted mite (red spider). It is well known that captan creates conditions favorable to mites. The addition of methoxychlor or DDT to one or two pre-bloom sprays encourages mites even more, but may be well worthwhile to control plant bugs, spittlebugs, and weevils.

Prevent outbreaks of 2-spotted mite by including a good miticide in pre-bloom sprays of captan. Kelthane is preferred. It has a long residual life, is not hazardous to handle and is of some value also against the cyclamen mite.

For outbreaks of 2-spotted mite that do occur after bloom, malathion and TEPP (BE CAREFUL with TEPP) are the only materials available. Follow label directions as to use near harvest.

* * * * *

New Materials may be given an Experimental Label and a Temporary Tolerance. Representatives of commercial firms and state or other official workers may suggest that you try certain new materials that have such an Experimental Label.

Such labels are given to manufacturers with the understanding that the material may be sold or given to growers for trial use under supervision. You, as a grower, are cooperating in a field trial of the material. Observations on its performance that are made by you and by official or commercial investigators or Extension personnel will help determine the value of the material in the pest control program.

Fruit treated according to directions on an Experimental Label may be sold through regular channels. Following tests of materials not yet labelled, even for Experimental use, treated fruit should not be sold for food.

---E. H. Wheeler

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NEW SHOTGUN SHELL EFFECTIVE AGAINST NUISANCE BIRDS

Several sound devices that produce frightening noises have been used in an attempt to move nuisance birds. The device known as an acetylene exploder, operated either from calcium carbide or an acetylene tank, produces deafening reports.

A more recent development is a shotgun shell, in 12 gauge only, containing an inner exploding cartridge which is impelled by the powder charge in the shell. The inner cartridge has a fuse which ignites when the shell is fired, causing the cartridge to explode at a distance of 100 to 200 yards away. Thus, the 12 gauge shell produces an explosive report similar to one from a regular 12 gauge shotgun shell. This is followed by a loud, sharp crack sound from the inner cartridge when it explodes. The second explosion occurs in mid-air if the shell is given the correct trajectory.

The new exploding shells are very good in frightening birds from agricultural crops when properly used. Our experience with the shells indicates that they may be particularly effective in conjunction with the acetylene exploder in certain situations. At present the shells, known as "shell crackers", are being manufactured in Japan and distributed by a company in the United States.

Your County Agent can supply you with the information as to price and where the "shell crackers" can be obtained.

---Wesley R. Jones

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FAITH IN THE NEW ENGLAND APPLE

On the last day of February, Mrs. Cole and I completed a seven and one half month trip of 22,400 miles into market areas in 35 states. Conferences were held at 20 state universities. More than 500 market people were interviewed regarding current operations and trends in marketing. These people included shippers, brokers, jobbers, wholesalers, processors, truckers, chain and independent buyers, supermarket operators, market reporters, market managers, association managers and secretaries, and state department of agriculture personnel. Producing areas and producers were visited. Over 150 supermarkets or grocery stores selling fruits and vegetables were visited and purchases made in many of them. The trip was made during a Sabbatic leave from the University of Massachusetts and co-sponsored by the Federal Reserve Bank of Boston.

The main object of the trip was to learn as much as possible about what is happening in the fruit and vegetable business around the country and to learn about the market prospects for the fruit and vegetable industry here in Massachusetts including the feasibility of modern market facilities.

Most people are convinced that their own area has many possibilities and like it as a place to live and work. That is good! Other areas have advantages and all have disadvantages once you get well enough acquainted to see the whole situation. In this regard Massachusetts is like the rest.

Differences come to light in a comparison of the advantages and disadvantages the strength and the handicaps that help or hinder a particular business.

It is my conclusion, after the trip, that the balance of the advantages and disadvantages in Massachusetts is decidedly in its favor as a place to grow and sell apples. I will also repeat a comment that has been made in several meetings. There has never been a time in this area that was any more favorable to the planting of apple trees than at present. A comparison of our soil, climate, market outlets, costs and competition points to the favorable business opportunities in fruit growing.

All areas have weather and many have variations that are more serious than ours. Nowhere is it possible to succeed with inefficient methods and careless operation. Some areas have hurdles due to climate, or distance from market or soil and seem to be almost insurmountable for all except those who carry a generous supply of courage in their shirt pockets. Boom areas and easy profits are practically nonexistent.

There are fewer farms, but larger ones, maintaining production in practically every section of the country. It is a common situation.

Nowhere are growers able to coast along comfortably in the same old way of doing things. Changes have to be met, head on, and adjustments thought out in the current scheme of things. No area is immune to change.

There is no reason why those who like New England as a place to live and fruit growing as a vocation cannot plan on a favorable business opportunity with good business management and attention to the necessary details of production and marketing.

Those who have faith in New England fruit growing have a faith that is well founded. It is their opportunity to have a good business and like it too!

---F. E. Cole

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TAKE A LOOK AT YOUR INSURANCE PROGRAM

With Costs of growing fruit still at high levels, fruit growers may well be concerned with ways of protecting themselves against disaster. One way of spreading risk is to buy insurance.

On your orchard consider using hail insurance. If you have had any past history of hail damage then hail insurance is something to be considered.

Your insurance agent may be able to offer you several types of policies. You may insure only certain blocks of trees rather than the entire orchard. Rates may vary and may seem high but losses can be substantial, too.

Fire insurance on your buildings and equipment--higher construction costs and higher costs of equipment may mean that adequate insurance would require larger policies. If you store the crop on the farm ask about a "schedule" policy which requires you to file a monthly inventory of fruit on hand. You pay insurance on the apples you have while you have them and not on apples after they move to market. It usually means good protection if for proper amounts and usually lower cost of insurance.

If you move your equipment to several farms, ask about "blanket" or "floater" insurance on equipment instead of including it on your fire insurance policy.

Suits for injury or damage to people or their property have been becoming more frequent so consider Public Liability insurance on your premises in a Farmer's Comprehensive Insurance policy or a General Comprehensive Policy. Particularly important if you have visitors coming to the farm.

Consider Workmen's Compensation insurance to protect you in the event your employees are injured on the job.

Don't forget insurance on non-registered motor vehicles used on the farm.

If you sell directly to the public or if you sell in marked packages consider "product" insurance to protect you against suits of consumers who may be made ill by eating your farm products.

Adequate motor vehicle insurance is important and should include coverage for travel both on and off the "ways of the Commonwealth." Property damage should be included with public liability coverage.

Other special insurance coverage may well be a consideration for some farms.

Begin consideration of insurance by raising three questions: 1, What are my chances of a loss occurring? 2, How much can the loss be if it does occur? 3, How can insurance be obtained and what will it cost?

Where possible--buy comprehensive coverage if offered, buy policies with deductible clauses where offered, buy policies for a greater period than a year and pay premiums in yearly installments if necessary, be sure your agent understands your farm operation--what you do, who visits your farm, what property or risks you wish to insure, where and what you sell, and read you policy.

---Lawrence D. Rhoades

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FRUIT NOTES

MAY 15, 1958

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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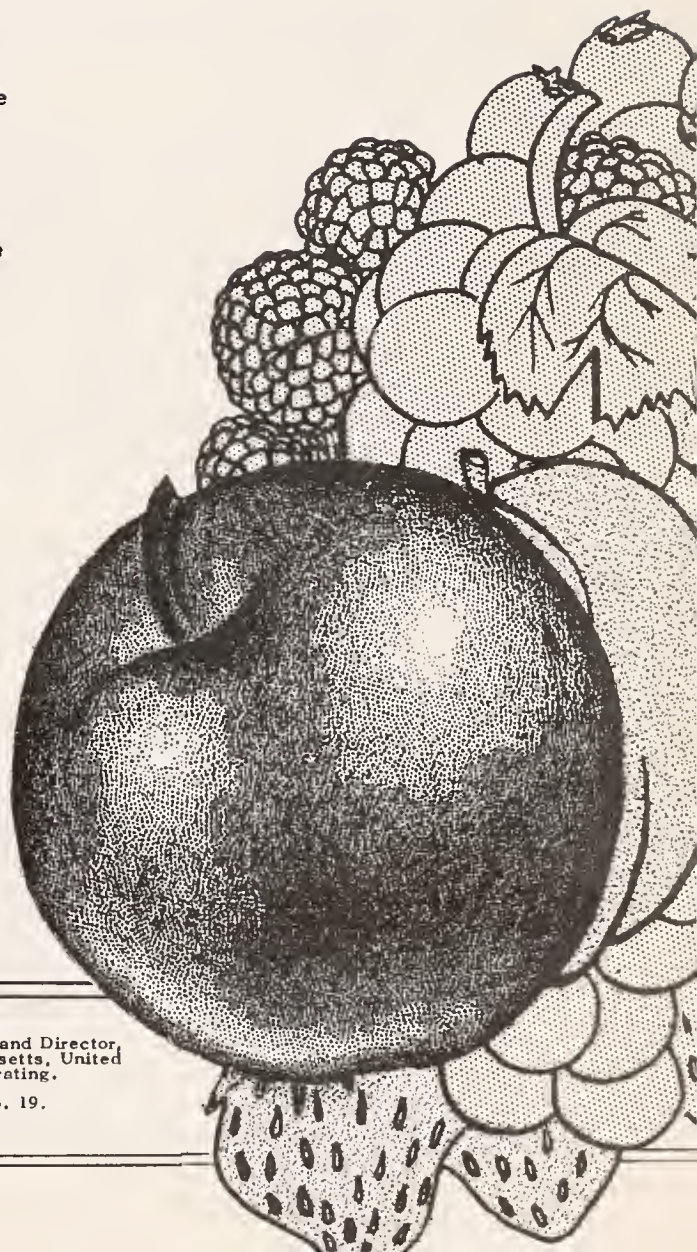
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A COMPARISON OF VERMONT WITH OTHER APPLE PRODUCING AREAS

An Apple Tree Survey was conducted in 1957 by the Extension Service, University of Vermont in cooperation with the U.S.D.A. Agricultural Marketing Service. Table 1, which appears on the next page, was prepared by Prof. C. Lyman Calahan, Extension Horticulturist, University of Vermont, and it shows the size of the Vermont Apple Industry and how it compares with some other apple areas. It can be noted that there are 86 apple orchards in Vermont as compared with 371 in Massachusetts. The smallest orchard reported in the Vermont survey had 117 trees. The Massachusetts Apple Orchard Survey was on a similar basis in the orchards with 100 or more apple trees were surveyed.

The percentage of trees of various varieties in Vermont in comparison with those in Massachusetts is shown in Table 2.

Table 2 - The Percentage of Trees of Various Varieties in:

Vermont		Massachusetts	
McIntosh	64.2	McIntosh	48.6
Northern Spy	12.0	Baldwin	14.1
Delicious	10.1	Red Delicious	10.8
Cortland	6.0	Cortland	7.7
Greening	1.9	Early McIntosh	3.1
Others	5.7	Others	15.7

About 95 per cent of the Baldwin trees in Massachusetts are 10 years old and over and about 73 per cent of the Northern Spy trees in Vermont are 28 years or older. The non-bearing tree population indicates that Red Delicious will be the second leading variety in both Massachusetts and Vermont in the future.

Vermont has storage capacity for 457,500 bushels of apples 44,000 of which is CA storage.

The average apple crop for Vermont for 1945-1954 in comparison with the other New England States is shown in Table 3.

Table 3 - *New England Apple Production, by States.

State	Average for 1945-1954
Massachusetts	2,276,000
Connecticut	1,191,000
New Hampshire	890,000
Maine	862,000
Vermont	782,000
Rhode Island	160,000

* Source: Crop Reporting Service, United States Department of Agriculture.

---William J. Lord

TABLE 1 - Vermont and Some Other Apple Areas Compared

State	No. of Orchards	Total Acres	Tree Ages - Percent		Leading Varieties		
			Non-Bearing	Old	1st	2nd	3rd
Vermont	86	3,562	(1-7 yrs) 11.9	(28+ yrs) 54.5	McIntosh	No. Spy	Delicious
Maine	119	4,311	(1-9 yrs) 27.9	(30+ yrs) 18.4	McIntosh	Red Del.	Cortland
Massachusetts	371	---	(1-9 yrs) 16.7	(30+ yrs) 31.4	McIntosh	Baldwin	Red Del.
Maryland	136	---	(1-11 yrs) 47.3	(27 yrs/over) 20.0	York	Stayman	Red Del.
Virginia	1,405	55,853	(1-11 yrs) 32.7	(27+ yrs) 35.4	York	Red Del.	Stayman
N.Y.-Lake Ont.	1,448	37,763	(1-7 yrs) 22.5	(28+ yrs) 39.1	R.I.Greening	McIntosh	Baldwin
W. Virginia	267	21,130	(1-7 yrs) 30.0	(28+ yrs) 27.0	York	Delicious	Stayman
Pennsylvania	1,368	---	(1-7 yrs) 25.4	(28+ yrs) 27.0	York	Stayman	Red Del.
Quebec	---	29,000	(10 yrs/under) 42.0	(Over 10 yrs) 58.0	McIntosh	Snow	Melba
Nova Scotia	---	20,000	17.0	83.0	McIntosh	Gravenstein	Wagner
Ontario	---	41,000	29.8	70.2	McIntosh	No. Spy	Delicious
British Col.	---	24,000	27.4	72.6	McIntosh	Delicious	Winesap

STRONGER AND HARDIER APPLE TREES

Even though very low temperatures or extended periods of low temperatures have occurred during the past two winters, there doesn't seem to be evidence of winter injury to Vermont apple trees. In fact, there are not many active growers who remember the severe losses of Baldwins, Spys, Red Delicious and even Macs during the 1933-34 winters. Much of the injury to these varieties caused at that time is still taking a toll of broken scaffolds and dying trees, often without being recognized as associated with winter injury.

The hardy stock, Malus Robusta No. 5, developed by the Canadians, shows a lot of promise for planting to help avoid future losses caused by winter injury as well as to develop stronger trees. Robusta, being a clonal stock, is propagated in much the same way as are the dwarfing stocks. This makes them a little more difficult to get and more expensive than seedling stocks.

The Vermont Horticultural Society, working with a prominent Quebec apple grower who is producing hardy stocks on a commercial basis, is assisting Vermont apple growers to obtain hardy trees. The first sizable plantings will be made this spring by about 20 Vermont growers.

Two tree-building systems are used. In the first, a single bud of the scion variety is set by the nurseryman in Robusta stock at a point about 20 inches above the crown. The resulting scaffold system is of the scion variety and no special budding or grafting work is required by the apple grower after planting. The second method is that of budding or grafting onto a trunk and scaffold system of the hardy stock. In this system, growers plant Robusta 5 and usually bud the scion variety onto 4-6 scaffolds during the first two years the tree is in the orchard. This requires more time and know-how, but evidently will result in an even hardier and stronger scaffold system than where a single bud is used.

A very favorable crotch angle development is being observed even on Red Delicious and Spys grown by the single bud as well as the topworked system. This may be due to the high vigor of the Robusta root system compared to seedling stock. Single budded trees are always planted as one-year trees because growth during the second year in the nursery is very fast, possibly because the root system is one year older than the usual seedling roots used. Most of the hardy trees being ordered are McIntosh and Red Delicious with the best local strains being collected and sent to the nursery for budding on a custom basis.

---C. Lyman Calahan

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WHATS HAPPENED IN THE PAST THIRTY YEARS IN THE APPLE INDUSTRY IN NEW HAMPSHIRE

Pruning

Pruning thirty years ago was a controversial subject and still is. There were as many methods of pruning in 1927 as there were growers and times haven't

changed growers views on pruning very much. We knew very little about the relation of growth of twigs or branches and the formation of blossom buds or to production of the time of blossom bud formation. We didn't talk about weak and vigorous wood and its effect on fruit set. I think most of the pruning was done just for the sake of pruning and many growers pruned a good deal more severely than they do today. For the period of 1930 to 1940 the practice was to prune apple trees very little the first 5 to 6 years after planting. Unpruned trees came into bearing at an early age but experience showed later that the frame work on such trees was not as strong as on trees where a few branches were selected to form the framework of the tree.

Today pruning is done partly to fit the trees to the equipment and partly to improve the quality of the fruit. Weak, low-productive wood is removed and trees are headed back and the top centers thinned out to make spraying and harvesting easier.

The development of compressed air pruners and elevated platforms from which pruning can be done has been quite a help in speeding up the pruning operation.

Brush removal was a slow and tedious task thirty years ago. The brush was picked up by hand and placed on a wagon or drag and hauled out of the orchard. Practically all of the hauling was done with horses. The drag provided the most economical way to remove brush. A simple way to unload the brush from the drag was to tie one end of a long rope to the back end of the drag and then string the rope along the bottom of the drag and place the remainder of the rope in a coil at the front. When the drag was loaded and hauled to the unloading place the rope was thrown over the top of the brush, a horse hitched to the loose end and the brush rolled off.

Later the brush burner became popular, then the buckrake on the front end of a tractor and more recently the large rotary mower. All of these pieces of equipment have helped to simplify the removal of brush from the orchard.

Hormones

The idea of having a material that could be sprayed on trees in the spring to thin the fruit and in the fall to stick the fruit on was not even dreamed about thirty years ago. It would have been thought fantastic. The discovery in 1939 that naphthaleneacetic acid and some related compounds would delay the preharvest drop of McIntosh, saved the apple growers in New England many millions of dollars and no doubt **was** partly responsible for the continued heavy planting of the McIntosh variety. No orchard practice has ever been accepted as a general practice in so short a time as the use of stop-drop materials. Prior to the discovery of these hormones growers were resigned to picking from 25 to 50 per cent of the McIntosh crop off the ground. Today most growers hand pick at least 90% of their crop of this variety. These materials have played a part in the increased yield per acre by permitting the grower to harvest a larger percentage of his crop.

Thinning apples thirty years ago was done only in a limited way and all of it was done by hand. The research work on thinning showed that thinning would improve the size and quality of fruit if done early in the growing period. Varieties such as Wealthy, Duchess, Golden Delicious and Early McIntosh required thinning in order to obtain marketable fruit but the cost of hand thinning usually was greater than the difference in returns received. Recent experience and research has shown that some of the hormone materials as naphthaleneacetic acid and naphthaleneacetamide can be used to thin apples and their use is becoming a standard practice in many orchards today.

Soil Management

Not too much was known about soil management in orchards thirty years ago. Most of the bearing orchards were grown in sod. Some of the young orchards were being cultivated, manure and wood ashes when available, were used as fertilizers. It was during this period that the value of a hay mulch and nitrogen was established. The celebrated fertilizer plots started by Dr. Gourley at the Woodman Orchards in Durham and later continued at the Horticultural Farm by Prof. Potter showed the importance of nitrogen as a fertilizer for apple trees. The experiment on the use of hay mulch by Dr. Shaw of Massachusetts was the forerunner of the sod-mulch system of soil management which helped in a large way to make the production of apples profitable on our rough hilly land. Without the sod-mulch system it isn't likely we would have an apple industry in New Hampshire today.

Minor element deficiencies were not recognized thirty years ago. I remember the first boron deficiency injury reported in New Hampshire. It was on the Harry Chase Farm in Lyndeboro on Gravenstein trees. Some experimental work by Dr. Latimer showed that the injury could be corrected by adding a half pound of borax to the soil under the trees. Magnesium deficiency was also a mystery at the time. It wasn't until 1940 that the browning of leaves and defoliation on apple trees was known to be caused by magnesium deficiency and could be corrected by applications of epsom salts as a spray to the foliage.

Number of Growers and Size of Orchard

The decrease in the number of apple growers and the increase in size of operation is one of the most noticeable changes in the industry. I don't know of any record of the number of apple growers in the State in 1927. The correspondence regarding the better apple campaign between H. A. Rollins and the County Agents showed that 463 growers from 8 counties owning 121,226 trees were entered in the campaign in 1927. From the comments in 1927 in these letters about 1/3 of the growers in an area entered the contest. This would indicate that there were around 1500 apple growers in the State thirty years ago. The majority of the growers operated between 50 and 200 trees. Some of the figures in these letters are interesting. For instance, Belknap County reported 104 growers signed up in the campaign with 14,000 trees. Sullivan County, 15 growers with 3,000 trees. Cheshire County, 29 growers with 10,550. Merrimack County, 87 growers with 50,000 trees. Strafford County, 36 growers with 10,228 trees. Hillsboro County, 117 growers with 63,722 trees and Rockingham County, 63 growers with 23,763 trees. Today Sullivan, Cheshire and Strafford Counties have less than ten commercial growers each. Rockingham and Hillsboro Counties are still the largest apple producing counties with around 100 commercial growers each.

Size of operation has greatly increased and the decrease in the number of growers and the number of trees has not reduced the total yield of apples in the State. Production in 1927 according to the 1927 Crop Report was 1,100,000 bushels. In 1957 the yield of apples in New Hampshire was 1,300,000 bushels.

The high cost of labor, the large investment in equipment, the necessity of refrigerated storages and the difficulty in marketing a small volume of apples all contributed to this change in size of operation and the number of commercial growers. Many of the smaller orchards were taken over by the larger growers in the neighborhood resulting in the salvation of many of these small units. The present growers are selecting better sites on which to plant new orchards.

Investment and Cost of Production

The average investment 30 years ago of buildings and land without counting the value of trees as reported in the New Hampshire Agricultural Experiment Station Bulletin 279 was fifty-five hundred dollars. The average total investment including value of trees, equipment, personal property, land and buildings was \$19,800. Today total investments in some of the larger operations in the State is \$100,000 to \$150,000. The cost today of a 10,000 box cold storage is greater than the average total investment in an orchard 30 years ago.

--- E. J. Rasmussen

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S U M M E R F R U I T T O U R A N D M E E T I N G

Reserve July 17 and 18 for a summer fruit tour and meeting.

Several orchards in the Nashoba area will be visited on July 17th. On the morning of July 18th, a half day speaking program will be held at the University and in the afternoon an orchard in Franklin County will be visited.

-Editor-

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NEW FDA RULINGS TO HELP IN MITE CONTROL

Producers of small fruits should be encouraged by a recent Food and Drug ruling which allows Kelthane, also known as 1, 1-bis(chlorophenyl)2,2,2-trichloroethanol, to be used on strawberries and all cane fruits after bloom and up to 2 days before harvest.

Kelthane is a miticide (acaricide) and is especially useful against 2-spotted mite (red spider) which can become serious between bloom and harvest. In the 1958 Strawberry Chart, malathion and TEPP are suggested because at that writing no other materials were available. Now that Kelthane is approved, it is to be preferred.

Unfortunately, dusts containing Kelthane are not available. For dusting, after bloom we have only malathion to suggest for strawberries.

Cyclamen mite also can be checked with heavy, drenching sprays of Kelthane. It is not the best material for this pest, but it is the only one we may suggest for the bearing bed. With it a threatened crop can be saved.

* * * * *

Apple growers also should be interested in Kelthane for summer applications against 2-spotted mite and late red mite. Single applications should be compared with Aramite used in the same way. Like Aramite, Kelthane provides no "fringe" benefits against other pests, but it can be very valuable at times when such benefits as provided by the organic phosphates are not needed. Even with Kelthane, as with all other materials, thorough coverage of underneath surfaces is essential to 2-spotted mite control.

---E. H. Wheeler

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POMOLOGICAL PARAGRAPHS

Pruning Peaches

Visits to peach orchards during the month has led the writer to believe that some growers in their pruning operations are not pruning to replace the winter injured wood. With a good crop of peaches, considerable limb breakage may occur. More heading back should be done on some of the scaffold branches. These branches should be headed to a desirable outward growing lateral. Well placed branches on the inner parts of the tree should be retained so that they will subsequently replace older wood.

The Same Old Story

The failure of timely removal of filler trees in an apple orchard has been discussed and probably will be discussed as long as apple trees are grown. Perhaps if more growers had the opportunity to visit orchards over the State as frequently as the writer, more would be done about the timely removal of filler trees. This last month the writer observed a block of trees in which the filler trees are severely crowding the permanent trees. Practically all the lower branches on the permanent trees have been shaded out, and the trees are getting too tall.

Last summer an excellent example was observed of competition between permanent and filler trees for moisture as shown by fruit size. In this particular block, only part of the filler trees had been removed and fruit size was noticeably smaller where the filler trees remained in competition with the permanent trees for moisture.

Training Young Trees

Considerable time was devoted during the month to pruning of young trees. There is less tendency than formerly to leave the young apple trees unpruned

during the first five to six years after planting. The purposes of pruning young trees is to train them to a desired form. The time to remove the undesirable limbs is when they can be pruned with hand pruning shears. To delay the training of young trees until it is necessary to make many saw cuts is to wait too long.

---W. J. Lord

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TWO KINDS OF CLOVER MITES

Clover mites feed on the foliage of fruit trees and various grasses and other plants, and have recently come into prominence as household pests. In orchards they are particularly troublesome when applications of DDT are not accompanied by adequate mite-control measures.

Fruit growers often become alarmed in early spring when they notice millions of clover mites feeding on the orchard cover crops. A few weeks later the mites appear in the trees on the 'mouse-ear' leaves. Recent studies in British Columbia¹ and at the University of Massachusetts², however, indicate that the 'clover mites' on the cover crop are not the same as those which later feed on apple foliage.

By banding the trunk and scaffold limbs of apple trees with an adhesive, it has been shown that the 'clover mites' feeding on the apple foliage live primarily on the leaves. They migrate to the twigs to lay their eggs and shed their skins, but do not move down to the trunk or ground. These mites pass the winter in the egg stage on the apple twigs.

The 'clover mites' on the ground cover, however, spend the winter in both the egg and active stages underneath the loose bark at the base of trees. Because they overwinter partly as active stages, they appear on their food plants earlier in the season than those on fruit trees. They feed only on grasses and similar plants but do not migrate up the trunk to feed on the apple foliage, hence are of no real concern to the apple grower.

* * * * *

¹Anderson, N. H., and C. V. G. Morgan. 1958. Canad. Ent. 90(1):23-42

²Levine, H. R. Unpublished data

---Harvey R. Levine

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CA ROUNDUP

Most CA rooms have been opened and the repacking and selling of CA McIntosh is well under way or completed. All CA rooms in Massachusetts, and perhaps with one or two exceptions throughout New England, were run well enough to qualify under the New York State CA law. This law requires, among other things, that a CA room reach an oxygen level of 5 per cent within 20 days and that this level

be maintained for at least 90 days. Generally, the fruit from CA rooms is in good shape and is selling at profitable prices. However, some disorders are present and the condition of fruit within a given room may vary considerably from lot to lot.

After looking over quite a few CA McIntosh it is apparent that when a room is properly run failure to have good fruit when the room is opened is usually due to the fact that poor fruit was put in the storage originally. Such things as overripe, off-grade, bruised, and stem-punctured fruit are troubles which have occurred prior to storage. The same is true for boxes which are slack. Even the severity of storage scald may be related to picking fruit in too immature a condition or allowing it to remain out of storage too long after harvest. Findings in New York indicate that the amount of scald on CA McIntosh increases quite rapidly if storage of the fruit after harvest is delayed more than 24 hours. In our tests this year McIntosh scalded more in regular cold storage than in CA if the apples were similar and were placed in and taken out of storage at the same time. The opposite was true for Cortland, however.

Aside from scald, fruit splitting and rot were problems in some lots of McIntosh. In CA rooms the humidity must be kept high to prevent shriveling. Consequently, mist nozzles have been installed in most CA rooms. Sometimes boxes with which the mist comes in direct contact tend to develop more split fruit and rot than boxes farther away from the nozzles. It is our observation that large fruit or apples which went into the storage in an overripe condition are most apt to split, but excessive water from mist nozzles may increase the tendency of such apples to split. Often apples from one source are much more susceptible to splitting and rotting than from another even when the fruit is in a similar position in the same room. This means that the condition of the fruit when it comes to the storage is often of primary importance in determining the extent of these difficulties. It also seems that fruit packed in old wood may develop more rotten apples than fruit in new boxes. Old wood, especially if it has contained rotten apples in the past and no attempt has been made to disinfect it, probably represents an excellent source of rot spores for every new batch of apples.

Some carbon dioxide injury was evident in slight amount in some storages. This trouble can be further reduced in amount by running the CA room at about 3 per cent carbon dioxide for the first month and at 5 per cent thereafter, rather than at 5 per cent throughout the storage period.

Summary

1. It should be re-emphasized that only good sound fruit be placed in a CA room. McIntosh apples in such rooms should average about 15 pound flesh firmness at harvest. In order to have firm, crisp McIntosh in March and April, one must put a good hard apple into the storage. Probably, it is better to put firm apples which lack the best red color into a CA room rather than fancy colored apples which are too ripe if a choice must be made.

2. The best McIntosh for CA should not exceed 3 inches in diameter. Over-size fruit does not keep well in any kind of storage and is much more subject to splitting and internal breakdown than smaller fruit.

3. Use apples from blocks which have not been heavily fertilized with nitrogen. We have noted marked differences in apples from trees with varying levels of nitrogen. Apples from trees with a moderate N level are noticeably superior to high nitrogen fruit.

4. Be sure to place only blemish-free fruit in CA rooms. Culls are culls even after they've been in a CA room. They just take up space.

5. Move apples to a CA room rapidly so that no more than 24 hours elapse between harvest and storage.

6. Put the fruit in clean or new boxes.

7. Handle fruit with extreme care in the orchard and en route to the storage so that bruising and cuts are kept at a minimum. Careless picking and handling plus over or under filling of boxes in the orchard can result in excessive bruising and stem cuts. All skin cuts represent an excellent place for rot to start.

---F. W. Southwick

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STRAWBERRY NOTES

Red Stele of Strawberries.

Red stele is a cool, wet weather disease. The root core, or stele, develops the characteristic brick red symptoms in early spring. The first case observed this spring was found on April 25 in a field of Howard plants in Falmouth. Plants in this field showed red stele symptoms for the first time in the spring of 1956. It was a mistake to replant this field to a red stele susceptible variety.

Shipping Strawberry Plants

Now that polyethylene film and bags are available there is little excuse for strawberry plants to arrive in poor condition, even when shipped considerable distances. If the plants are properly packed in film of the right thickness and not subjected to excessive heat in transit, they will arrive in good condition.

Recently I received three lots of strawberry plants which are good examples. One lot was shipped in a crate without even a paper liner. Naturally they were very dry on arrival. They might have been a total loss if they had remained in a hot office over a weekend. In a second lot, the plants had been dipped in water before being placed in polyethylene bags. As a result, many plants had either crowns or roots decayed or both. In a third lot, the plants had the soil shaken off the roots before being placed in the polyethylene bags with no added moisture. They arrived in excellent condition.

Polyethylene film will let gasses such as oxygen and carbon dioxide escape, but it is impervious to water or water vapor. The water that goes into the bag

with the plants stays there. Plants put in dry lose very little moisture because it can't escape. Even a piece of wet paper toweling or wet sphagnum put in the bag can result in too much moisture followed by decay.

It is not safe to use polyethylene film thicker than 2 mils because gasses cannot escape rapidly enough. As the plants respire, oxygen is used up, carbon dioxide increases and the plants smother.

---John S. Bailey

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CHEMICAL THINNING OF APPLES

At this time (late April) while apples are still in the pre-pink of development, it looks as though most growers have sufficient McIntosh bloom for a moderate crop. Naturally, following the heavy crop of last year, this year's bloom is expected to be lighter than a year ago and a smaller crop is anticipated. However, there are occasional blocks or orchards which suffered unusually high losses from frost in 1957, which are going to bloom heavily this spring; and such blocks should be watched closely so that a thinning treatment may be applied if it seems necessary.

In general, the need for chemical thinning of McIntosh will probably not be nearly as great as it was a year ago. However, the decision on this point can be delayed until 10 to 14 days after petal-fall. Probably the most dependable means of determining the need for chemical thinning of McIntosh 10 to 14 days after bloom is by calculating the number of fruits set per 100 blossoming clusters by actual count on several trees. This means that the number of blossom clusters on at least 2 limbs of 5 to 6 trees must be counted and recorded in each block. Then the number of fruits developing on the same limbs must be determined 10 to 14 days after petal-fall. If one finds (by dividing the number of apples by the number of blossom clusters) an average set in excess of 50 to 60 fruits per 100 blossoming clusters on trees that have a reasonably heavy bloom, some thinning of McIntosh may be necessary. A final set of 25 to 35 fruits per 100 blossoming clusters seems to be about right for heavy to moderate blooming McIntosh. If 50 or less fruits are left 10 to 14 days after petal-fall, one may expect reductions in set during the June drop period to be sufficient so that chemical thinning will not be necessary. When in doubt, omit the spray or use no more than a weak spray of NAAmide (25 ppm or 4 oz. of Amid-Thin per 100 gallons of water). We have never seen this treatment seriously overthin McIntosh. ✓ m

Of course, many other varieties may need thinning if they bore little or no crop a year ago. Suggestions concerning such varieties are given in Special Circular No. 189, Chemical Thinning of Apples, which was revised this spring and is now available from your County Agent or from the Mailing Room, University of Massachusetts, Amherst, Massachusetts.

Following a couple of seasons' work with NAA and NAAmide, with and without additives such as light oil or Tween 20, we have come to the conclusion that the

use of additives is not desirable for apples in chemical thinning sprays. Additives greatly increase the absorption of NAA and NAamide, but do not necessarily cause more thinning than the same concentration of NAA or NAamide alone. Also, additives may markedly increase the foliage injury from a given concentration of NAA or NAamide.

---F. W. Southwick

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FRUIT NOTES

JUNE 18, 1958

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

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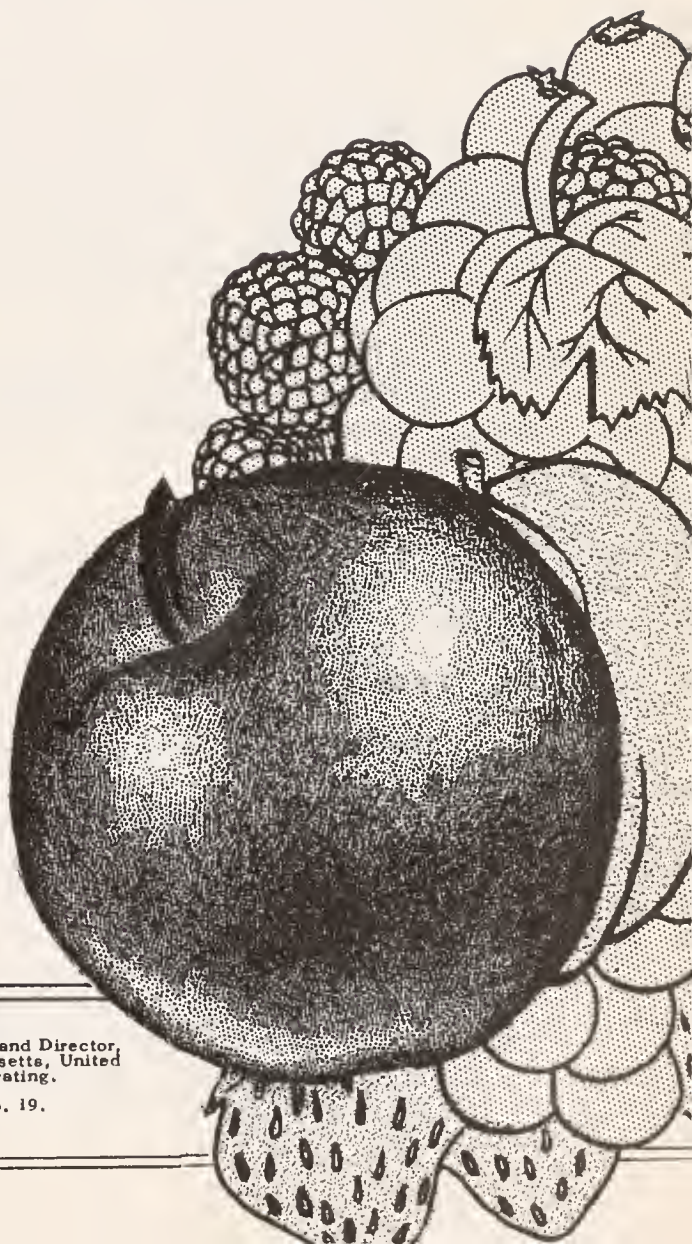
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WHAT'S HAPPENED IN THE PAST THIRTY YEARS IN THE APPLE INDUSTRY IN NEW HAMPSHIRE

Pest Control

It would be interesting to try to grow a crop of apples today using the recommendations in the 1927 spray schedule. The changes in pest control, both in the development of materials and equipment have had a real influence on the yield and quality of fruit and also on the cost of production.

In 1927 the spray schedule for apples consisted of four pages and one of these was a cover page. The spray schedule listed three fungicides: Bordeaux, lime-sulfur and New Jersey Dry-Mix and two insecticides: lead arsenate and nicotine sulfate. Six sprays were recommended.

Today's spray program consists of thirty-two pages. It lists fifteen fungicide or combination of fungicides and fifteen insecticides. Some of these materials are effective against only one pest.

More information is available today on the life histories of the various pests which aids greatly in timing the spray application.

The only control measure for apple maggot thirty years ago was to pick up the dropped fruit at weekly intervals beginning about July 10.

The first work to show that apple maggot larvae would mature in dropped McIntosh and Baldwin apples was done on the Carl Dearborne orchard in Weare in 1929. At that time there was a real controversy between some of the Entomology Departments in New England and New York as to the merits of spraying with lead arsenate to control apple maggot. It was not realized that apple maggot larvae could mature in late varieties and since only early varieties were picked up there was always as good infestation from year to year from late varieties.

The fact that larvae emerged from late varieties and that fly emergence some seasons occurred in late September was evidence that sprays later than July were necessary to control apple maggot and helped to settle the controversy as to the value of sprays for maggot control.

Browntailed Moths were controlled by cutting off the nests which were in the very tops of the trees during the dormant period, and the gypsy moth was controlled by painting the egg masses with creosote. A mixture of lead arsenate and fish oil was the recommended spray mixture for plum curculio control and what a smelly mess that was.

All of the materials suggested for use thirty years ago were injurious to the fruit and foliage. This injury was not considered serious during this period when materials were applied with low pressure nozzles and in very limited amounts. It wasn't until the development of high pressure, large volume pumps that severe injury from lead arsenate and from lime-sulfur was recognized as the cause of low yields and poor finish on fruit.

Today the less injurious effects of the spray materials on foliage can be in part credited with the increased growth of the trees and higher yields as well as the better finish on the fruit. The new materials cause less defoliation and the trees today produce larger and greener foliage. This better foliage makes more carbohydrates available for growth of fruit, spurs, shoots and foliage.

Costs of materials have increased. Spray material costs per box in 1927 was as low as two to two and one half cents. Today it is twenty to twenty-five cents or about ten times as much.

Pest Control Equipment

Spray and dust equipment has also been greatly improved. Thirty years ago all of the equipment was hauled by horses. Today it is hauled by either trucks or tractors. Hand spray machines were still in use in 1927 although power sprayers and dusters were owned by many of the growers. Most of the machines were low capacity, three to ten gallons per minute pumps and operated by a two to five horse power engine. Bamboo rods on which were mounted nozzles with a capacity of one to three gallons per minute were standard equipment. Spraying was all done from the ground, dragging fifty feet or more of hose. A six to ten gallon per minute outfit required three men to operate it, one man driving, sometimes only one horse and two men spraying. Tank capacities were from 50 to 200 gallons.

Spray guns and large capacity, high pressure machines appeared in the early 30's and later the multiple spray nozzles. The development of this better equipment made it possible to force spray solutions greater distances and growers began riding the spray rigs and using larger capacity guns and nozzles. This method greatly speeded up the spraying operation and made applications more timely. Along with the larger machines came the water supply tanks with large valves. This equipment made it possible to fill the spray tank in a few minutes. About fifteen years ago the air blast machines were developed and today machines delivering 50 to 75 gallons per minute operated by one man does most of the spraying in orchards in New Hampshire. Supply tanks on trucks deliver spray solutions directly to the sprayer in the orchard greatly increasing the amount of spray applied per hour. Today one man will apply more spray in an hour than three men did in a whole day in 1927 and do a more thorough job.

Night spraying was introduced in 1930 in New Hampshire. The cover picture on our orchard practice bulletin published in 1934 is a night spraying scene at the Horticultural Farm. Around-the-clock spraying made more efficient use of spray equipment permitting growers to take care of a larger acreage and apply more timely applications.

Recently the application of concentrated sprays has increased the number of trees that can be covered with a tank of spray solution and also has increased the efficiency of the pest control equipment.

The use of air craft the past two or three years is receiving more attention as a means of applying pest control materials. The development of more effective materials such as dichlone, parathion and DDT which can be applied safely at high concentrations has made the application of such materials practical. In 1956 several hundred acres of apple orchards in New Hampshire were treated by helicopter with a 3 per cent dichlone dust in the pre-pink and pink applications for scab control. Growers were well satisfied with the result and we can expect the use of air craft for pest control to increase.

Some idea of the spraying operation in 1927 can be obtained from a letter by James Purrington, County Agricultural Agent in Rockingham County to H. A. Rollins, Extension Horticulturist at that time. This letter contains a report on a spray ring organized in 1926 and operating in the town of Atkinson. One paragraph is as follows: "We did spraying for 23 persons outside the ring and sprayed 800 outside trees. In the ring there were approximately 600 trees sprayed. Including members of the ring 12 person sprayed once, 13 twice and 5 three times. Some of us intended to spray the fourth time but did not get to it personally I shall try to spray five times this coming season adding the pre-pink and the three weeks after calyx to the ones put on this year as scab and railroad worm developed in my McIntosh in storage."

Apparently the effectiveness of the program was not satisfactory and the importance of additional applications was recognized by the growers. Commercial growers were more consistent in their spray program and produced a higher percentage of clean fruit than did the small growers.

There were 20 insects and diseases listed in the 1928 spray program: apple maggot, plum curculio, codling moth and scab were the most serious pests and still are in our orchards today. Browntailed moth, apple curculio, red bug and Brook's spot are seldom seen today. European red mite was first discovered in the Parker Orchards in Lyndeboro in 1928. Leaf roller, two spotted and yellow mites are new pests that have appeared in the past 30 years.

Progress has certainly been made in pest control. The new materials and better equipment has taken much of the gamble out of this most important orchard practice.

---E. J. Rasmussen

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POMOLOGICAL PARAGRAPHS

Red Stele Again

"Sparkle strawberry plants were found infected with red stele in two fields on a farm in Falmouth. Since Sparkle is resistant to the A strain of red stele, this indicates that there are at least two strains in these fields. This is the second place in which more than one strain of red stele has been located in Massachusetts. This is another indication that the disease is spreading and that growers should be especially careful about the source of their planting stock. Never forget that a field once infested will remain so for 18 to 20 years."

Diuron as a Weed Killer in Cultivated Blueberries

For several years a weed killer called C.M.U. has been on the market. It has recently been renamed Monuron. Although it is a good weed killer for many purposes, it is a little too potent for safe use on all varieties of blueberries.

A close relative, Diuron, which is less soluble, has been found to be just about as effective and much safer when used according to directions. It is very effective in controlling annual weeds for long periods when applied pre-emergence.

The FDA has recently granted a label for the use of this material in plantings of cultivated blueberries in Massachusetts and New Jersey. Read the directions on the package carefully before use.

Cold Resistance of New Blueberry Varieties

How cold resistant are the new blueberry varieties Earliblue, Bluecrop, Blueray, Berkeley, Herbert and Coville? Will they come through a severe winter and produce a full crop? Are the blossoms resistant to late frosts? Unfortunately, we have no experimental data on which to base answers to these questions. We still must depend on a few random observations.

Bluecrop and Blueray, at least under New Jersey conditions, appear to be outstanding in their resistance to severe winter cold. For the past two years these varieties have borne a full crop when other varieties, such as Coville, Berkeley, Weymouth and Concord, had only 50-75 percent of a crop.

Bluecrop and Herbert seem to be the outstanding in their ability to resist spring frosts. Several instances have been reported when, following severe frosts during bloom, these varieties came through with full crops and others were severely damaged. This indicates that the reason is actual cold resistance of the blossoms and not escape by late blooming.

---John S. Bailey

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THIN THOSE PEACHES

The consumer wants large, well-colored, high quality peaches. Peaches of this type cannot be produced on an overloaded tree. The ability of a peach tree to develop size in its fruits depends upon (1) leaf area per fruit, (2) nutritional status of tree and (3) the water available throughout the growing season. All growers may not be able to apply water to supplement rainfall but all growers can thin. In spite of high labor costs, the effort made to thin the peach crop should pay dividends as shown in the table below. A 3-inch peach has about 3 times the volume of a 2-inch peach. A 2 1/2-inch peach has 2 times the volume of a 2-inch peach. Trees bearing a heavy unthinned crop of peaches produce small-sized low valued fruits. In addition, limb breakage may be excessive which reduces the future bearing capacity of the trees.

Number of Peaches per Bushel for Given sizes of Fruit

<u>Diameter of Peach</u>	<u>Peaches in Bushel</u>
2 inch - - - - -	380
2 1/8 inch - - - - -	315
2 1/4 inch - - - - -	280

<u>Diameter of Peach</u>	<u>Peaches in Bushel</u>
2 3/8 inch - - - - -	225
2 1/2 inch - - - - -	190
2 5/8 inch - - - - -	165
2 3/4 inch - - - - -	145
3 inch - - - - -	110

---W. J. Lord

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✓ MANURE FOR CULTIVATED BLUEBERRIES

Can manure be used as fertilizer for cultivated blueberries? The simple answer is yes. Manure is good fertilizer for blueberries but it must be used with reason. It won't do to assume that if a little is good, more is better, like the fellow who put a whole wheelbarrow load of manure on a single bush and killed it.

Fifteen years ago we carried on an experiment at Amherst using horse, poultry and cow manure on bearing blueberry bushes. Horse manure was used at the rate of 10 tons per acre and the other at such a rate as to give about the same amount of nitrogen. The dire results predicted failed to materialize. In fact, the manurial treatments were just as good as commercial fertilizer, based on yield and size of fruit.

Since horse and cow manure usually contain about the same amount of nitrogen, they can be used at the same rate. Based on our experimental results, 10 tons per acre is safe for bearing bushes. For younger bushes the rate should be less according to age and size of bush. Poultry manure ordinarily contains twice as much nitrogen as horse or cow manure. Therefore, the rate needs to be halved. Five tons per acre is sufficient for bearing bushes.

No higher rates than 5 and 10 tons per acre were tried. Hence, we do not know if the blueberries will stand more. If the manure were well rotted and weathered, or had a high proportion of bedding or litter in it, bearing bushes probably would stand more.

Can well rotted manure be used in the planting hole? Possibly, if the manure were well rotted and weathered so that it is nothing more than organic material, but the practice is questionable. Manure, unless it has been well rotted and weathered, contains much soluble nitrogen and can be damaging to small plants in the same way that too much chemical fertilizer with soluble nitrogen can injure small blueberry bushes.

We know from experience and experiment that acid peat is excellent in the planting hole. If acid peat is placed around small plants on the soil surface, the roots will grow up into it so that after a year's time they will be almost setting on top of the soil. If the peat is placed at the bottom of a trench and the blueberries set on top, the roots will grow down into the peat.

Probably the next most desireable material is well decayed leaf mold, woodland turf, or wood from rotten logs or stumps.

In heavy clays, sawdust mixed with the soil has been used successfully to lighten it up. Unless the sawdust is pretty well decayed, it's use will require the application of additional nitrogen. This must be done with great care when small plants are involved.

---John S. Bailey

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WHAT ARE UNPROFITABLE TREES?

There are as many definitions of unprofitable trees as there are orchardists. There have been many recommendations made to fruit growers with rules for indicating when trees should be removed from the orchard. The only safe rule to apply is the one that begins "it depends" and ends "on your situation."

The following situation is one taken from a Massachusetts orchard and illustrates a method which can indicate the effect of a change on net income from the orchard.

This orchard consists of 45 acres of orchard with 1830 trees in blocks with trees aged from 10 to 40 years and about evenly distributed by age groups of five years. The 40-year trees are large. The average production on the orchard is 13,000 to 14,000 bushels with 12,000 bushels sold on the average. It is proposed to remove a five acre block of the older trees because of size and estimated cost of picking and spraying. Yields on the average are 280 to 300 bushels per acre with the oldest block at 400 bushels per acre. The owner and one year-round employee plus seasonal help are used.

Returns and costs in a recent year are given below. An estimate of the effect of removing a five acre block on net income is also shown. All equipment is owned and a 10,000 bushel refrigerated storage costs are included in the items of expense. Excellent quality crops are grown and sold at wholesale with some retail sales included in total income. A change in the number of producing units does not affect all cost items alike, some change and some do not.

	Before Removal of 5-Acre Block of <u>Oldest Trees</u>		After Removing 5-Acre Block of <u>Oldest Trees</u>
<u>Total Sales</u>			
11,100 bushels	\$29,500.	2000 bushels less	\$24,135.
<u>Expenses</u>			
Year Round Labor	2,100.		2,100.
Weekly and Monthly Labor	3,526.)		(3,126.
Harvesting	3,168.)		(2,666.
Spray and Dust	5,930.)	Reduced Somewhat	(5,445.
Fertilizer	1,230.)		(1,130.
Truck and Tractor	1,721.)		(1,521.
Containers	3,855.)		(2,947.
Seeds, Plants, Supplies	328.)		(328.
Electricity and Telephone	387.)		(387.
Repairs - Equipment	390.)		(390.
Buildings	140.)	Changed very little	(140.
Taxes	580.)		(580.
Interest	524.)		(524.
Insurance	151.)		(151.
Miscellaneous	432.)		(432.
	<u>\$24,462.</u>		<u>\$21,867.</u>
Net Farm Income	\$ 5,038.		\$ 2,268.

The adverse effect of such a change on income results from the fact that "fixed costs" or "overhead" items are affected very little and variable costs are not reduced proportionately to the reduction of income from lowered production.

In planning a change a budget such as the above will indicate the effect on income of a shift in operations affecting income.

In general, changes in production that result in lowered production require new production or a reduction in fixed costs. Fixed cost reductions are usually rather difficult on a fruit farm. Since most farms acquire fixed costs over time, on fruit farms a tree replacement program geared to prospective tree removal is an important part of farm management.

The suggestion was made that 150 trees be removed on a selective basis within the blocks on basis of yield. The total crop reduction was estimated at 1000 bushels. A partial budget was used to estimate the effect on net income; balancing items which would increase income; that is, benefits against items that would decrease income, detriments with the following result.

The effect on annual net income of the orchard if 150 low producing trees are removed:

Benefits:

Additional Receipts	---	
Reduced Costs:		
Less weekly labor	\$200.	
Reduced Harvesting	300.	
Less Spray material	150.	
Fewer Packages	455.	
Less Fertilizer	<u>50.</u>	
Total		\$1155.

Detriments:

Additional costs	---	
Reduced Receipts:		
1000 bushels @ \$2.657	<u>\$2,657.</u>	\$2657.

Benefits less detriments - reduction in net income -\$1503.

Since trees once removed take some time to replace, a careful estimate of the effect of a tree removal program should be made before taking this irrevocable step on the basis of snap judgment.

---Lawrence D. Rhoades

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RESEARCH FINDINGS FROM OTHER AREAS

The Effect of Cover Crop Management on Soil Moisture in a Young Apple Orchard

The effect of cover crop management on soil moisture in a young apple orchard was studied by Russell Eggert, Department of Horticulture, University of New Hampshire, the results of which should be of interest to fruit growers. The study was conducted in a young apple orchard at the University of New Hampshire to determine the effect on soil moisture of not mowing orchard cover during the months of June to August, or mowing either once or twice, in some instances letting it lie and in others removing it. The orchard cover was similar to that found in Massachusetts orchards being principally Canada Bluegrass intersperse with some "quack" grass.

Soil moisture readings showed that failure to mow grass cover in early June resulted in rapid depletion of available water from the soil at both 12 and 30 inch depths during the two growing seasons that the experiment was conducted (June and July, 1951 and 1952.)

"The practice of mowing grass cover in early June, and of leaving it in place, delayed the start of second growth and was more effective in conserving moisture early in the season than when the mowed cover was removed. This was true at both the 12 and 30 inch depths."

Effect of Irrigation on Fruit Size and Yield of Peaches in Pennsylvania

The effect of irrigation on fruit size and yield of peaches in Pennsylvania was studied by Joshua Feldstein and Norman F. Childers, Department of Horticulture,

Rutgers University to determine the benefits, if any, of irrigation of peaches in Pennsylvania.

The experiment was conducted during the 1955 growing season on eight year old trees of the varieties Golden Jubilee, Newday and Elberta. All trees received uniform cultural practices except for irrigation. After the June drop the fruit on all trees were thinned to a uniform spacing.

The rainfall during April, May, July and September was below normal but the rainfall for August was 3 times normal. Pennsylvania like Massachusetts had hurricane rains during August of 1955. Also like Massachusetts, temperatures were exceptionally high in the months of July and early August.

The trees to be irrigated received supplemental water 3 times during a 5 week period (July to August). Three inches of water was applied each time.

Irrigation resulted in a significant increase in fruit size and yield of all three varieties. The yield of Golden Jubilee, harvested August 10th to 13th, showed an increase of two bushels per acre over non irrigated trees. Ninety-five per cent of the fruit harvested from the irrigated trees was 2 1/4 inches in diameter or larger as compared to only forty per cent of this size from non irrigated trees.

Irrigation of the Newday variety, harvested August 15th to 18th, resulted in an increase of 1.4 bushels per tree. Seventy-five per cent of the fruit harvested from the irrigated trees was 2 1/2 inches in diameter or larger while only fifty per cent of the fruit from non irrigated trees were of this size.

The Elberta variety, harvested on September 10th to 13th, showed an increase of one bushel per tree over non irrigated trees. Ninety per cent of the fruit from the irrigated trees was 2 1/4 inches or larger whereas from non irrigated trees 75 per cent were of this size. Although 16 inches of rain fell in August during the period of the final swell of the Elberta peaches, there was a significant increase in size and yield of fruit on the irrigated trees. The trees had been irrigated during the dry period in July and the results obtained were in agreement with other research findings in that a prolonged drought during any period of fruit development will result in an ultimate reduction of fruit size and yield.

The fruit from the irrigated trees was harvested in one picking, whereas two pickings were required on the non irrigated trees. In addition, the fruit from irrigated trees ripened two to three days earlier than did the fruit from non irrigated trees.

Due to irrigation, shoot growth on all three varieties was increased significantly. Irrigation had no effect on color nor pit-splitting.

---W. J. Lord

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N O T I C E

The next issue of Fruit Notes will be a combined July - August issue and will be published August 15.

CROP PROSPECTS

Maine

All varieties of apples appear to have a good blow of blossoms this year. Good pollination weather for most varieties. Trees appear vigorous except where early frosts injured a few leaves but trees are recovering rapidly. Scab is general but most growers are clean so far. Crop prospects in general look good.

---Rudolph A. Poray

Massachusetts

At this time (June 2), it appears as though most growers have sufficient set for a moderate crop of McIntosh and Cortland. The Red Delicious crop in most orchards will be light. This year's crop should be about the average for 1945-1954 which is 2,276,000 bushels.

In spite of the cool, wet weather during the latter part of April and in May, McIntosh bloom date was about normal for Amherst which was between May 14 - 16.

Bee activity was frequently held up by cool or rainy weather but most orchards had enough warm, sunny hours between May 12 - 18 to insure pollination.

Frost was no problem for the most part. Frosts during the last weekend in April caused some bud killing to Red Delicious and Gravensteins in Middlesex County. For the most part, however, the damage was not sufficient to reduce crop prospects. On May 14, frosts caused slight damage to orchards located on low sites in Hampshire County.

Peach flower buds came through the winter with little killing and in spite of cool weather during bloom a large crop is in prospect.

---William J. Lord

Connecticut Orchard Conditions as of May 29th

Peak of apple full-bloom was in mid-May about ten days later than '57. Pollination weather although not perfect was satisfactory. Not as much spread in bloom dates between early and late sections of State as is generally expected. Set on apples less than last year -- Mac's lighter than '57 -- Red and Golden Delicious very light -- Pears generally heavy set. Peaches very heavy following general freeze-out in '57. Blossom brown-rot infection in some blocks severe. Thinning will be necessary. Some growers like the "rubber-hosed-stick" method.

Some blossom and twig botrytis infection in some blueberry plantings. Elgetol ground treatment for mummy-berry appeared to reduce botrytis.

Strawberries good--limited frost damage to earlier blossoms in lower fields. First berries should appear late in first week of June. Cutworms prevalent.

Average for State indicates most growers applied first cover on apples last week in May.

Many growers did not complete pruning--"busy packing apples and too much nasty weather." Pruning will continue into growing season making smaller and smaller cuts as the season progresses. More and more "snip pruning" is being done especially on Red Delicious and on pears.

Grass killer chemicals applied under the tree are being tried by more and more growers. Results look promising.

Annual Fruit Day and N.Y.N.E. Apple Institute Meeting at University of Connecticut June 25th.

Several Connecticut Growers are planning to attend the Massachusetts Fruit Tour July 17 and 18.

New Jersey Growers will tour Connecticut orchards by bus in early July.

---A. C. Bobb

Vermont Apple Crop Outlook Good

As of the last week in May, the 1958 Vermont apple crop prospects are for the heaviest crop since 1955. Almost all McIntosh blocks in all sections carried a heavy bloom. Cortland, Red Delicious and Northern Spy bloom was from good to heavy. Unseasonably cool pre-bloom temperatures delayed Mac full bloom until the 19th and 20th in the Shoreham area and the 26th and 27th in Grand Isle which is about average or a day or so late. Periods of cloudy, windy and cool conditions, plus a very humid day on the 19th, are factors which limited bee flight compared to the 1955 season. Late April frosts caused some bud killing to Delicious and Greenings, especially on lower branches, in Addison and Rutland County orchards. Clusters are seldom observed in which more than two blossoms have been killed.

The severest pre-bloom scab condition in several years has caused heavy scab on unsprayed trees, but commercial growers have done an excellent job so far. Most air-dusted or sprayed orchards had four scab control applications by full pink time.

This year's Vermont crop is expected to be above the 1951-57 average.

---C. Lyman Calahan

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THE VERMILION STRAWBERRY

Recently, Vermilion plants with a severe case of what appeared to be June Yellows were observed in two fields in Middleboro. Specimens were sent to Dr. McGrew at Beltsville, Md., to make sure that a virus was not involved. He confirmed the diagnosis--June Yellows. He stated also that they have not found any stock of Vermilion plants which are free of both virus and June Yellows. Unless a stock free of both can be found, the future life of Vermilion as a variety probably will be short.

In California the Cupertino variety produces fruit of high quality and looked very promising. After a few years it went all to pieces with June Yellows, or Blakemore Yellows as they prefer to call it, and has been discarded. The severity of the June Yellows observed in Vermilion at Middleboro suggested a similar fate.

- - - John S. Bailey

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A R E M I N D E R

Reserve July 17 and 18 for the Summer Fruit Tour and Meeting.

Several orchards in the Nashoba area will be visited on July 17th. On the morning of July 18th, a half day speaking program will be held at the University and in the afternoon an orchard in Franklin County will be visited.

-Editor-

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FRUIT NOTES

POMOLOGY DEPARTMENT
UNIVERSITY OF MASSACHUSETTS, AMHERST

JULY-AUGUST, 1958

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WHATS HAPPENED IN THE PAST THIRTY YEARS IN THE APPLE INDUSTRY IN NEW HAMPSHIRE

Packages

✓ Thirty years ago the barrel was still in use as a container for apples. In the 1927 annual report of the Society all the grading and packing regulations were for barreled apples. The Western boxed apples were beginning to compete with the Eastern grown fruits on our market. The Eastern growers soon realized that some changes had to be made in packaging and grading if they were going to retain their markets. The Boston Produce box, a solid bottom, shallow, nearly square box in use for vegetables was first tried but was found to be unsatisfactory. Too much bruising occurred to the fruit while being transported and marketed. Next an effort was made to introduce the Western box. The cooperative extension service constructed grading and packing tables which were transported from place to place where demonstrations were held. The Western box was also found wanting. The low percentage of fancy fruit that could be packed in this package, the cost of wrapping and packing, and the lower price received, compared to the Western boxed apples were some of the reasons this pack was not accepted by growers or buyers.

✓ The jumbled pack appeared to be the most desirable package for Eastern grown apples. In order to prevent bruising by packing too tight a pack a box with a capacity of $1 \frac{1}{5}$ bushels was first suggested and tried. This box would hold a bushel of fruit level full and could be closed with a corrugated cardboard cover and two slats. It was soon found that buyers were not satisfied with a slack pack and that some growers in order to make a sale would put up a bulging pack containing $1 \frac{1}{4}$ bushels of apples. Giving an extra $\frac{1}{4}$ bushel just to make a sale did not appeal to many growers and a compromise was finally made on a box with a capacity of $1 \frac{1}{8}$ bushels. This is our standard Eastern apple box today. Recently the shift is to the cell pack in cartons and to the 3 and 5 pound polyethylene bag. From a 100 pound container to the 3 pound transparent bag is quite a change in packaging.

Grading, Packing and Marketing

New Hampshire apple grading laws date back to 1917 when the first grading regulations were established. In 1927 an effort was made by the New England States to have uniform grading regulations for apples for the entire area. Our grading regulations were modified that year to conform very closely with the United States grades except for color requirements. Color requirements for New Hampshire grades are a little higher than for the Federal grades. The grading laws have been modified slightly during the years to meet changes in marketing conditions.

Packing apples thirty years ago was done mostly in the orchard. Some growers sold their fruit directly to buyers, others sold to commission merchants and some fruit was stored in large commercial storages. There were nine commission merchants, one exporter and two commercial storage operators advertising in the 1927 Annual Report. A common practice was for buyers to visit growers prior to harvest and offer a price for the crop, harvested and graded according to the buyers specifications: the buyer supplying the barrels or containers. These

buyers were mostly speculators. This may not have been the best way to sell apples but the grower always knew what he was receiving for his crop. Sometimes the buyers lost on the deal but there always seemed to be enough buyers around to gamble on the next crop even if the previous year had been one in which they lost heavily.

The shift from the barrel to the box as a container for apples and the demand for a better graded pack made it impractical to pack in the orchards. As a result barns were converted to packing houses, equipment was developed for sorting and sizing the fruits and the grading and packing operation was moved indoors.

During the late 1930's and in the 40's elaborate sorting and sizing equipment was developed but the McIntosh apple was so easily bruised that this equipment was not satisfactory and much of it has been discarded. Hand packing directly out of the picking box is still the preferred method for grading and packing McIntosh apples. In other words there has been little progress here in the East in the handling of apples in the packing house in the past 30 years. There is no doubt that suitable sizing and grading equipment can be developed to handle McIntosh and a project for the development of such equipment by the experiment stations in New England or by private organizations should be encouraged by the growers and by the several Horticultural Societies in New England.

The Souhegan Apple Packing Association, the first and only cooperative apple packing house and cold storage in New Hampshire was organized and built in 1924. This cooperative organization operated for ten years. The organization had its own brand and packed under the Doc-a-way Probile, Top-Notch and Meda labels. They also purchased fertilizers and spray materials for their members. The cooperative is still active but acts as a promotional and marketing organization.

Today apples are sold direct to retail stores, through commission merchants and through distributors. There is considerable interest in the organization of a cooperative marketing organization, through which a volume of uniformly graded apples could be offered and in that way attract buyers and provide an opportunity to bargain with experienced buyers representing the large chain stores.

Apple Storage

The heavy planting of McIntosh soon increased the volume of this variety to be marketed. McIntosh did not keep well in common storage and had a short marketing period under the conditions that existed at that time. Some work in 1929 to 1933 on McIntosh held in refrigerated storage at 30 to 32° F showed that this variety would remain in a good marketable condition for six to eight months. There were only three refrigerated on-the-farm storages in New Hampshire in 1927. One at the Applecrest Orchard in Hampton Falls, one at Woodmont Orchards in Derry and the other at the Cooperative Packing Plant in Wilton. For a number of years large commercial refrigerated storages in cities stored apples for

growers and offered a marketing service. This method of storage is used very little today. It had a number of disadvantages: other kinds of produce were often stored with the apples, sometimes giving an off flavor to the apples. The fruit had to be graded and packed before it was sent to storage and there was little opportunity to repack if spoilage occurred. Circulation of the air was often unsatisfactory in these large storages resulting in either too high or too low temperatures and usually too low humidity for proper storage of apples. Today there are forty-four on-the-farm cold storages for apples in New Hampshire with a total capacity of 700,000 bushels. This trend to on-the-farm storages helped greatly to supply a much better grade of fruit for the market.

The controlled atmosphere refrigerated storage is further progress in helping to maintain a better quality McIntosh over a six to eight months marketing period. Six of the seven controlled storages that we have in New Hampshire were built in 1957. The total capacity of this new kind of storage is 70,000 bushels.

A Look at the Future

Changes in the apple industry in New Hampshire in the next 30 years can be just as spectacular as they were in the past 30 years.

Some of the changes that could easily come true are:

Introduction of varieties more resistant to disease and insect attack, and firm enough to permit the use of grading and packing equipment and with long stems so picking can be done with harvesting equipment.

Automatic equipment (electric eyes) that will grade fruit for color and blemishes.

Artificial pollination making it possible to regulate size of crop without thinning.

✓ Chemicals that will promote the red color of apples when applied as sprays without causing premature ripening.

✓ Controlled atmosphere storages in which the concentrations of the gases will be controlled automatically.

New apple products and by products. We will likely be drinking more of our apples.

Atomic energy to reduce damage from frosts.

Systemic materials that can be applied to the soil or injected into the tree for pest control.

Light or sound waves to control insects.

Increase use of air craft for applying pesticides.

Harvesting equipment such as picking machines and elevated platforms.

Better methods for determining the fertilizer needs of the trees.

Good sites and large acreage will be necessary to warrant the capital investment required for an economical unit.

How safe is an orchard investment today compared to 30 years ago: An orchard investment should be less of a gamble because of the better pest control materials and equipment, longer marketing periods due to refrigerated storages, better varieties, improved soil management practices and cooperative advertising and marketing. Investment, however, is several times greater and careful consideration should be given to the many things that will influence the future of the business. An orchard is a longtime investment. Selection of the site and location should receive special attention. Is the farm large enough or can additional land be obtained if modern technology continues and makes it necessary to enlarge the business? What will the land be used for 30 years from now? Will it be more valuable for house lots or industrial sites? Can the investment in a large cold storage and packing house be justified if some other use is made of the land than growing apples? Should all of the family savings be plowed back into the business?

One thought to keep in mind is that the valuation of a farm property whether it is an orchard or a dairy barn should be based on who the most typical buyer is likely to be if it becomes necessary to sell and what he is most likely to use the property for.

The production of apples will continue to be a specialized and intriguing business. It will require a wider knowledge of insects and diseases, chemistry, refrigeration, engineering, plant physiology, marketing and salesmanship than at present.

--- E. J. Rasmussen

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C O R R E C T I O N !

In the June 18, 1958, issue of Fruit Notes on page 9 paragraph 5 the following sentence appeared: "The yield of Golden Jubilee, harvested August 10th to 13th, showed an increase of two bushels per acre over non irrigated trees." The sentence should have read - two bushels per tree not per acre.

---William J. Lord

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REDUCING HARVEST BRUISES ON McINTOSH APPLES

In 1920 a group of fruit growers designated as the "Ten Year Program Committee" proposed practices for the betterment of the fruit industry. One of the proposals was as follows. "Pick carefully. Rough handling is responsible for many a poor apple that the consumer gets."

To what extent are apples being picked carefully today?

In an attempt to answer this question a study was made of harvesting practices in twenty McIntosh orchards during the 1957 harvesting season.

In each orchard, wherever possible, a fifty apple sample from two boxes harvested by each of five pickers was obtained. This made a random sample of five hundred apples from each orchard. In a few orchards the harvesting procedure was such that the sample had to be obtained regardless of who picked it.

Each apple in a sample was examined for bruises and skin punctures.

The apples were classified with respect to mechanical injuries as those having: (1) few small bruises, (2) many small bruises, (3) 1/2" to 3/4" bruises, (4) 3/4" to 1" bruises, (5) bruises 1" and over, (6) skin punctures.

With one exception this study was made in orchards with a total production of all varieties ranging from 14,000 to 40,000 bushels.

In the majority of the orchards a metal picking bucket with canvas bottom was used. Splint baskets, peach baskets, metal pails and canvas picking bags were the containers used in other orchards.

In fifty percent of the orchards pickers were paid on the piecework basis, in forty percent on the hourly basis and in ten percent both systems were used. The range in pay on the piecework basis was 18 to 25 cents per bushel. The range on the hourly basis was \$1.00 to \$1.25.

In orchards where pickers were paid on a piecework basis 14.4 percent of the apples harvested had one or more 1/2" bruise while in orchards where pickers were paid on the hourly basis 4.5 percent of the apples had one or more 1/2" bruise. This suggests rather conclusively that the piecework basis of pay is more conducive to bruising than the hourly basis.

A range of 60 to 75 bushels picked per eight hour day per man was considered a satisfactory day's work by the majority of growers. One grower does not allow any picker to pick more than eighty bushels in a day when paid on a piecework basis.

The cost per bushel at \$1.25 per hour is less, even when only fifty bushels per day per man is picked, than the average cost when picked by piecework.

Obviously the harvesting procedure was adapted to each particular orchard and no two methods were identical.

Three methods employed by growers whose apples had a minimum amount of bruising are described briefly as follows:

1. Pickers equipped with a metal picking bucket with canvas bottom. Pickers divided into crews of twelve to fifteen men with a competent foreman for each crew. Specific instructions given each crew on how to pick with a minimum of bruises. One person, usually a woman, who takes a sample of apples from boxes harvested by each picker at least twice during the day and checks samples for bruises and stem punctures. In one orchard with a large number of pickers it was necessary to employ two women to check bruises.

Pickers causing excessive bruising are reported to foreman of the crew who shows picker how to correct his method of picking.

2. Pickers divided into crews as described above.

Each picker equipped with a splint basket with hook attached. Pickers take filled baskets to central location in area being picked. Crew of women transfer apples by hand from baskets to field boxes and also eliminate culls. Excessive bruising by any picker can be noted and corrected.

3. Pickers divided into crews as described above.

Each picker equipped with a canvas strap which he attaches to a peach basket so that basket is suspended from one shoulder. Filled peach baskets trucked to mechanical grader where apples are immediately segregated into grades and sizes and then stored. Foreman keeps close watch on extent of bruising by the pickers. Transferring apples from picking container to field box is eliminated by this method. With each of the methods described the pickers were paid on an hourly basis.

The charts on page 7 show the records from two orchards. Orchard #1 is representative of orchards with a minimum amount of bruising while orchard #2 is representative of orchards with maximum amount of bruising.

In these charts the number of apples in the classification: "Number of apples with few small bruises" is of relatively little importance as the amount of bruising is not sufficient to affect the grade. However, there is a significant correlation between the number of apples with few small bruises and the number with 1/2" bruises.

The number of apples with 3/4" - 1" bruises and 1" bruises and over was not recorded. However, the number of apples in each of these classifications is practically identical with the number of bruises.

In orchard #1 the procedure described in method 1 above was employed. The production of all apples in this orchard was approximately 25,000 bushels. The pickers were paid on an hourly basis.

ANALYSIS OF HARVESTED APPLES

Orchard 1

Fifty apple samples from each of two boxes chosen at random from five pickers.

Picker	1	1	2	2	3	3	4	4	5	5	Totals
No. Apples with few small bruises	4	11	7	2	2	1	4	4	0	1	36
No. Apples with many small bruises	0	0	0	0	0	0	0	0	0	0	0
No. Apples with 1/2" bruises	1	4	3	3	0	0	0	1	1	1	14
No. bruises 1/2" - 3/4"	1	4	3	3	0	0	0	1	1	1	14
No. bruises 3/4" - 1"	0	0	0	0	0	0	0	0	1	0	1
No. bruises 1" & over	0	0	0	0	0	0	0	0	0	0	0
No. Apples with cuts & punctures	0	2	2	2	0	0	0	0	1	1	8
No. cuts & punctures	0	2	2	2	0	0	0	0	1	1	8

COMMENTS

Pickers 1, 2 and 5 were inexperienced Puerto Ricans. Precise instructions by the owner plus adequate supervision account for this good record.

ANALYSIS OF HARVESTED APPLES

Orchard 2

Fifty apple samples from each of two boxes chosen at random from five pickers.

Picker	1	1	2	2	3	3	4	4	5	5	Totals
No. Apples with few small bruises	28	31	26	22	17	18	4	6	14	11	177
No. Apples with many small bruises	2	4	9	10	0	1	0	0	3	0	29
No. Apples with 1/2" bruises	19	25	24	22	5	7	6	0	6	3	117
No. bruises 1/2" - 3/4"	27	29	32	25	6	7	6	0	1	2	145
No. bruises 3/4" - 1"	7	10	4	2	1	3	2	0	1	2	32
No. bruises 1" & over	0	1	1	0	0	0	0	0	0	1	3
No. apples with cuts & punctures	4	9	1	4	0	1	1	0	3	2	25
No. cuts & punctures	5	9	1	4	0	1	1	0	3	2	26

COMMENTS

All of the pickers in this orchard were considered experienced men. Each person picked by himself without supervision. Pickers 1 and 2 were chiefly responsible for this poor record. Note particularly the contrast between pickers 1 and 2 compared with picker 4. This reflects the importance of picker attitude.

In orchard #2 the production of all apples was approximately 15,000 bushels. The pickers were paid on the piecework basis. The lack of supervision cost this grower a considerable amount of money.

In the case of orchard #1 only 4.6 percent of the apples harvested would be eliminated from Fancy grade because of mechanical injury while in orchard #2 approximately 40 percent of the apples would be eliminated.

For the twenty orchards studied 17 percent of the apples would be eliminated.

This study indicates rather conclusively that mechanical injury of McIntosh apples at harvest can be minimized by:

1. Adequate supervision
2. Specific instruction of the pickers.
3. Payment of the pickers on the hourly rather than the piecework basis.
4. Discharge of the careless or indolent picker.

This study has demonstrated that McIntosh apples can be harvested, even in large orchards, with a minimum of bruising and that the attitude of a picker is more important than the number of years he may have been picking apples.

What happens to the apples as regards mechanical injury after they are picked is another story which will appear in a subsequent issue of "Fruit Notes".

---O. C. Roberts

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HASTEN THE RATE OF APPLE COOLING BY PROPER STACKING

Rapid cooling of fruit in the cold storage is an extremely important phase of cold storage management. The cooling of apples from field temperature to 32°F within 2 or 3 days instead of 4 to 6 weeks can make a great deal of difference in the rate of softening, breakdown, and moisture loss of the fruit. Suitable cooling capacity and air circulating systems cannot function properly if the fruit is not stacked in such a way that some air movement occurs along at least two sides of every box.

It is to be expected that suitable stacking arrangements must vary from room to room depending upon room size and shape, whether boxes are hand-piled or pallet-loaded, the type and location of the refrigeration diffuser, and the presence or absence of an air duct.

The basic idea behind any stacking arrangement should be such that the air from the cold diffuser moves through the stack, rather than short circuiting through open aisles or wall spaces, before it returns to the intake side of the cooling unit. Boxes should be stacked at least 6 inches from all walls, from 12 to 18 inches below the ceiling, and on slats at least 1 to 2 inches off the floor. This is necessary to allow for needed air movement around the sides, top, and bottom of the stack and to reduce the tendency of heat loss directly through the walls and floor.

Unlidded northeastern crates are best stacked with the lengthwise dimension at right angles to the flow of air from the diffuser or duct openings. For example, in a room with a central ceiling duct down the middle of the room which delivers air to the side walls from openings along the sides of the duct, boxes should be placed lengthwise along the side walls. If this is done the air, as it moves from the ceiling area into the side wall spaces, can pass through the openings between the top and bottom of each box and the spaces at ends of each box left open by the end cleats. In such a system an aisle beneath the duct serves as a return air channel to the intake side of the diffuser. Of course, during and after loading, the openings at the walls must be blocked off in such a way that air can't move from the side wall spaces to the aisle without moving through the stacks of boxes.

If no ducts are present and most of the air is delivered to the wall opposite the diffuser, the boxes should be stacked lengthwise to the wall opposite the diffuser; in other words, in a fashion directly opposite to the stacking method used where air is delivered to the side walls from a duct. If an aisle is left running at right angles to the diffuser, it obviously must be blocked off as well as the spaces on the side walls.

Probably this discussion is somewhat difficult to follow in the absence of a sketch of the room layout. Therefore, it is suggested that a sketch be made of the rooms involved and their air distribution system, so that the air movement in the room can be visualized. Then by appreciating the fact that air will move most readily along the path of least resistance, it may be possible to set up a stacking arrangement that will improve the rate of air circulation through the stacks of apples. Any improvements that can be made should be of help in prolonging the keeping quality of the fruit.

---F. W. Southwick

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SOIL FUMIGATION FOR BLACK ROOT OF STRAWBERRIES

The time is at hand to fumigate the soil for next year's strawberry bed. The question is whether to fumigate or not. Will it pay? There are two ways of approaching an answer. The first is the way we handle the sickness problem. Most of us don't call the doctor till we are sick. The the doctor prescribes some medicine and usually gets results. We can approach the soil fumigation problem in the same way. We can wait till there are symptoms of black root in a field, then, before the field is used for strawberries again, fumigate. This would be called, at least by some people, the more practical, hard headed approach.

The second method is the insurance approach. There is black root in the State. There is a possibility of bringing it in on infected plants. At least one of the causal organisms has a wide host range so that it may be carried over in these even though strawberries are not grown. Therefore, we could fumigate to ward off trouble before it starts. A few growers are convinced that regular fumigation as insurance pays. Most are waiting till trouble starts.

During the past two years experiments with soil fumigation in the town of Falmouth have resulted in an increase of about 2000 quarts per acre in favor of soil fumigation. The soil was a light sandy loam. Fumigating was done in the early fall. The variety Robinson was used in 1957 and Sparkle in 1958. EDB (ethylene dibromide) was used on the 1957 bed. Several materials were used on the 1958 bed but there was little difference among them.

A little quick figuring will show that in these cases soil fumigation paid quite well, 2000 quarts at 25 cents - this was a common price for "pick your own berries" - equals \$500. The cost of the commonly used soil fumigants is from \$50 - \$60. Application costs \$10 - \$20 an acre. Hence, \$500 of additional income was produced at a cost of \$80 or less.

Now, lets review a bit what we're talking about. When we say "black root" or "black root rot", we are referring to a condition of the root in which its outer sheath has died and turned black. Sometimes the inner "core" is still alive and white; sometimes it too is dead and black. Regardless of what kills it, the root will turn black. There are many causes for death such as cold, drought, fungus attack and nematode attack. Or death may result from a combination of these causes. There is a good reason to believe that in eastern United States a large part of the "black root" trouble is caused by microscopic worms called nematodes. These attack the roots and, if in sufficient numbers, kill the roots and cause them to turn black. Therefore, the soil fumigants most commonly used are those that will kill nematodes and are called nematocides. There are soil fumigants which will control fungi and weeds in addition to nematodes. These materials are much more expensive and are seldom used in strawberry fields unless some benefit other than nematode control is desired.

The most commonly used and cheapest soil fumigants for strawberries are D-D and EDB (ethylene dibromide). These are liquids which are injected into the soil to a depth of six to eight inches in bands ten inches apart. The liquid turns to a gas and permeates the whole soil. For effective use the soil - not air - temperature needs to be between 50 and 80 degrees Fahrenheit. It is also extremely important that the soil be properly prepared before fumigation. All plant remains must be thoroughly decomposed because any which are not can protect nematodes from the fumigant and may accumulate in front of the chisels of the fumigator and cause trouble. The soil must be moist and friable with all clods broken up as for a good seed bed.

② Since these soil fumigants are toxic to strawberry plants, it is necessary to wait three weeks after application before setting the plants. Because of this wait and the necessity for having the soil temperature at 50 degrees, letting the fumigation go till spring may result in very late setting of plants, especially if the spring is late and cold. Late summer or early fall is a good time to do the job.

Even the very best job of fumigating will not kill all nematodes in the soil. They will be likely to build up again so that for maximum protection a repeat treatment will be needed each time a strawberry bed is set.

The benefits of soil fumigation can be lost by setting plants which are infested with nematodes. Taking plants for setting from an old fruiting bed is risky. It is far better to get plants from a reliable nurseryman who starts out with clean plants and grows them in fumigated soil.

---John S. Bailey

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IS THE APPLE INDUSTRY OF MASSACHUSETTS

GOING TO TRY AND SELL

989,000 BUSHELS OF BRUISED APPLES THIS YEAR

DUE TO CARELESS PICKING?

(Records show that careless picking results in 43 one-half inch bruises per 100 McIntosh Apples)

- * Bruise-free apples frequently sell for 50¢ more per bushel.
- * One bushel in five is therefore lost (@\$2.50 per bushel) in careless picking.
- * It would be better to pick 4 bushels carefully than to pick 5 bushels carelessly. (Reputation in the market makes a difference)
- * Better 80% of crop picked carefully than 100% picked carelessly
- * Good picker supervision and/or pay incentives mean the difference.

Pickers do not pick with equal care.

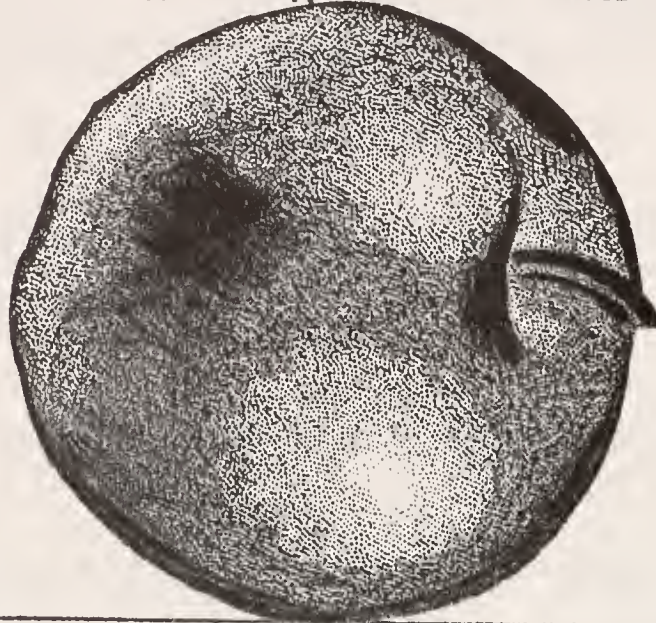
Variations between pickers is often great.

Picking foremen should

1. Find out which pickers are bruising apples.
2. Find out how these pickers are bruising apples
3. Instruct pickers in careful handling
4. Constantly check on all pickers.

---F. E. Cole

MICHIGAN STATE COLLEGE, Agricultural Experiment Station, Special Bulletin Number 374 by H.P.Gaston and J.H.Levin shows the following damage of three inch McIntosh apples dropped onto a flat solid surface:



VERTICAL DROP

1"

(Slight finger pressure
can equal a one inch
drop.)

1/2"
Bruise

3"

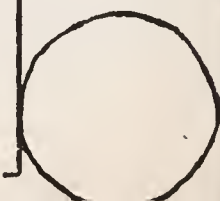
(A pinch or a squeeze can
equal a three inch drop.)

3/4"
Bruise

6"

1" Bruise

(A ball bounces
An apple breaks!!!)



McINTOSH APPLES FOR CA STORAGE

The volume of McIntosh apples going into CA storage is increasing rapidly. At the present time it appears that the capacity for CA fruit in Massachusetts will be at least twice what it was a year ago. The total capacity is expected to increase from about 190,000 bushels in 1957 to about 400,000 bushels in 1958.

As the volume of CA fruit available increases, it would seem reasonable to expect that high-quality fruit must come from CA storages if a premium is to be paid for such fruit. Once a good CA room is built and properly operated, the factor which has the greatest influence on quality of CA fruit is the condition of the fruit which is placed in the CA room. In other words, failure to have CA fruit of high quality is generally due to the fact that poor fruit was put in the storage originally.

The following is a list of points which should be kept in mind when operating and selecting fruit for a CA room.

1. McIntosh apples for CA rooms should average about 15 pounds flesh firmness at harvest if one is to expect to have a good crisp apple in April and May. It now appears that, if a choice must be made, it is better to put firm apples which lack the best red color into a CA room rather than fancy-colored apples which are too ripe.
2. The best McIntosh for CA are those between $2\frac{1}{2}$ and 3 inches in diameter. McIntosh over 3 inches in diameter are generally softer than smaller fruit and do not keep well in any type of storage. Large apples are much more subject to splitting and internal breakdown than smaller ones. Whenever possible, avoid fruit from trees carrying a light crop.
3. Use apples from blocks which have not been heavily fertilized with nitrogen. McIntosh apples from trees with a moderate nitrogen level are noticeably superior in keeping quality to fruit from high-nitrogen
4. Only sound, blemish-free fruit of suitable size is fit material for a CA room. Culls are culls even after they've been in a CA room. CA space is too valuable to be wasted on them.
5. Place the fruit in clean or new wooden boxes (never use cedar).
6. Move apples rapidly to the CA room so that no more than 24 hours elapse between harvest and storage.
7. Handle fruit with extreme care in the orchard and en route to the storage so that bruising and cuts are kept at a minimum. Careless picking and handling plus over or under filling of boxes in the orchard can result in excessive bruising and skin cutting. Skin cuts represent an excellent place for rot to occur.
8. If you wish to reduce the chances of carbon dioxide injury, maintain The carbon dioxide level at 3 percent instead of 5 percent for the first month.
9. Maintain a high relative humidity (90-95%), but don't operate the mist nozzles for more than an hour or two a day. Excessive operation

of mist nozzles can increase the amount of mold growth and rot on the boxes and fruit, especially in the area close to these nozzles.

---F. W. Southwick

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A R E M I N D E R

Now that apple harvest has started, copies of special circulars No. 245 and 246 would be helpful.

Special circular No. 245 is titled, "Harvesting Suggestions for Orchard Foremen". It covers five things that orchard foremen should show the pickers and nine things that they should tell them.

"Be A Better Apple Picker" is the title of special circular No. 246. This circular stresses seven harvesting practices the apple picker should follow in order to pick apples easier, faster and better.

Copies of these two special circulars may be obtained at your County Extension Office .

---Editor

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FRUIT NOTES

Prepared by Pomology Staff
Department of Horticulture
University of Massachusetts
Amherst

SEPTEMBER – OCTOBER, 1958

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APPLE BRUISING

The amount of bruises caused by dropping apples from varying heights and during the various harvesting and handling procedures was studied by H. P. Gaston and J. H. Levin of Michigan State University. Some of their findings are given below and show the importance of taking time to show pickers how to pick properly and avoid bruising.

Bruises Caused by Vertical Drops

A three inch McIntosh dropped one inch onto a flat hard surface caused a half inch bruise.

A three inch apple dropped three inches onto a sharp corner resulted in a skin break.

When an apple was dropped onto another apple or apples, several bruises usually resulted. Gaston and Levin found that when a 2½ inch McIntosh was dropped from a height of 12 inches onto another apple resting still on another apple that was resting on a flat board, the result was five separate bruises, each one of which averaged more than 5/8 of an inch in diameter.

Bruising During the Harvesting and Grading Operations

The following table presents data obtained by Gaston and Levin in their study of the amount of mechanical injury that resulted from the careless and the careful performance of various handling operations during McIntosh harvest.

TABLE I - Mechanical injury per 100 McIntosh apples, 2½ inches and up, resulting from the careless and the careful performance of various handling operations.

	No. of bruises ½" in dia.
Careless picking	43
Careful picking	1
Careless dumping into field crates	88
Careful dumping into field crates	0
Careless dumping onto receiving belt	86
Careful dumping onto receiving belt	19

Table I shows that 43 bruises of ½" in diameter were found per 100 McIntosh apples when the apples were carelessly picked. To simulate the careless picking operation the apples were dropped into a standard metal picking bucket with a canvas bottom. The fruit were dropped into the bucket from about the level of its' top edge or a little below. The first few fruits had approximately a 14 inch drop and the next 12 or 15 between 8 and 12 inch fall striking the apples lying on the canvas bottom. This was a drastic treatment, however, the practice is not uncommon in orchards. Only by adequate supervision and instruction can the tendency of pickers to drop at least some of the apples into their picking containers be kept at a minimum.

Careless dumping into field crates resulted in extensive bruising (Table I). In performing the careless dumping into field crates, the canvas bottom of the picking bucket was released while it was held at about the level of the top edge of the field box into which it was being emptied. The incidence of bruising in

this operation was more serious than that caused by any of the other operations studied by Gaston and Levin.

The careful dumping into field crates consisted of placing the full picking container on the bottom of the field box or onto fruit that was in it before the canvas was released. The picking bucket was then lifted slowly and gently so that the apples rolled slowly into the field crate.

GROWERS AND FOREMEN!

The importance of careful filling of field crates cannot be over emphasized and this operation should be carefully supervised if bruising is to be held at a minimum!

Dumping Onto Receiving Belt

It can be seen in Table I that careless dumping onto the receiving belt resulted in 86 bruises, 1/2 inch in diameter, per 100 McIntosh apples as compared to 19 when the job was done carefully. Gaston and Levin noted that when field crates were dumped by hand they were usually held in such a way that the fruit fell onto the receiving belt from a height of several inches. This method of dumping resulted in the extensive bruising shown in Table I. The bruising that occurred during the operation was one of the easiest and least costly to minimize. Some Massachusetts growers are using hand-operated mechanical apple box dumpers. Others use a pad which is placed over the top of the apple box when the box is tipped. After tipping the box, the grower gradually raises the pad to allow the apples to roll gently onto the receiving belt of the feed table on the grader. Another inexpensive dumping aid is a canvas bag. The worker dumping the apples places a canvas bag, one end of which is tacked to the grader, over the top of the box of fruit while he tips the box over. The worker releases the bag and lifts the box gently to allow the apples to flow out.

---William J. Lord

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LIVESTOCK THRIVE ON APPLE POMACE

In an experiment conducted by the Virginia Agricultural Experiment Station and U.S.D.A's Beef Cattle Research Station at Front Royal, Virginia beef cattle fed apple pomace not only thrived but gained more than animals eating locally grown feed.

Both wet pomace, containing 70 per cent moisture and dry pomace, derived from the wet pomace by partial dehydration with steam heat to a moisture content of about 4 per cent were fed. The wet pomace was stored in a covered shed with no packing or preservative. Even under these conditions the pomace remained nutritious, palatable, and unspoiled.

Unbred Shorthorn yearling heifers gained 115 pounds in 106 days on self-fed dry apple pomace and a pound of cottonseed cake daily. Other heifers fed sorgo - sudangrass - soybean silage and .75 pound of cottonseed cake gained only 32 pounds in the same period.

The moral here is: Don't let valuable pomace go to waste when livestock

men in the vicinity can use it to advantage. Why not let the pomace pay part or all of your pressing cost if you are in the business of making cider?

Incidentally, if you have a cider mill why not take advantage of the M.F.G.A. "Certified" Cider Program? For details write O. C. Roberts, Assistant Secretary, French Hall, University of Massachusetts, Amherst.

---O. C. Roberts

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RESEARCH FINDINGS FROM OTHER AREAS

Costs of Producing Peaches in New Jersey

The May, 1958 issue of Horticultural News published by the New Jersey State Horticultural Society contained an article by John W. Carncross, Department of Agricultural Economics, Rutgers University titled "Cost of Producing Peaches in New Jersey." The following excerpts from this article which summarizes the information obtained from 30 peach growers as to production and harvesting costs are of interest.

"Thirty peach growers cooperated in giving information on the costs and practices in the production of their crop for the year 1956. These farms were located in Burlington, Gloucester, Camden, and Atlantic Counties. Most of the growers produced vegetables in addition to peaches. Only two of the farms were specialized in fruit that is, growing only peaches and apples. The acreage of peaches grown per farm ranged from 5 to 125. Two-thirds of the farms were growing between 10 and 40 acres of bearing peaches. There was a total of 752 acres of bearing peach orchards included in the survey. Twenty-six of the thirty cooperators also had non-bearing peach trees, with a total of 221 acres. The details of the average costs for the 30 farms on a per acre basis for the bearing orchard are shown in Table I.

Table I. Cost of Producing Peaches on 30 Farms in New Jersey, 1956.
(Average per Farm)

	Yield of Peaches	244 bu.
Up to Harvest		
Fertilizer	1087 lbs.	\$27
Spray and Dust Material		51
Man Labor	73 hrs.	76
Machine and Equipment		35
Interest on Orchard Valuation		28
All Other Costs		45
Total Cost Up to Harvest per Acre		\$262
Total Cost Up to Harvest per Bushel		1.07
Harvesting		
Man Labor	121 hrs.	\$128
Containers		125
Other Harvesting Costs		17
Total Harvesting Costs per Acre		\$270
Total Harvesting Costs per Bushel		1.11

Marketing	
Commission	\$40
Hauling and Cartage	32
Hydro-cooler	14
Others	4
	<hr/>
Total Marketing Costs per Acre	\$90
Total Marketing Costs per Bushel	.37
TOTAL ALL COSTS PER ACRE	\$622
TOTAL ALL COSTS PER BUSHEL	2.55

Receipts	
Market Peaches	\$723
Rejects	33
	<hr/>
Total Receipts	\$756
Receipts per Bushel of Market Peaches	2.96
Returns per Hour of Man Labor	1.73
Total Acres of Peaches	752
Acres of Peaches per Farm	25

The cost up to harvest averaged \$262 per acre, or \$1.07 per bushel for the average yield of marketable peaches of 244 bushels. Harvesting costs, including containers, averaged \$270 per acre or \$1.11 per bushel, and marketing costs averaged \$90 per acre or 37¢ per bushel. The total of all costs was \$622 per acre or \$2.55 per bushel. In general, growers with above average yields produced a crop at less than average costs, while growers with below average yields produced at above average costs.

The growers applied an average of 11 sprays. Two-thirds of the growers sprayed between 9 and 12 times. The average expenditure for spray and dust material was \$51 per acre. Two-thirds of the growers spent between \$30 and \$70 per acre for spray and dust material. There was not a close relation between the amount spent for spray material and yield of peaches per acre.

The growers' estimates of the value of their bearing trees, including the land, ranged from \$300 to \$1,000 per acre. Two-thirds of the growers' estimates fell within the range of from \$400 to \$600 per acre.

An average of 73 hours of man labor was used per acre in producing the crop prior to harvest. This expenditure of \$76 per acre for man labor was the largest single item in production costs up to harvest. In harvesting the crop, the cost of \$128 per acre for man labor only slightly exceeded the average expenditure of \$125 per acre for containers. The 3/4 bushel was the most common container used, although many sold part of their crop in a 1/2 bushel container.

The year 1956 was a favorable year for the production of peaches. These growers received an average price for their peaches of \$2.96 per bushel. This varied considerably between growers, depending on their method of sale. The return per hour of man labor averaged \$1.73, which also varied sharply between farms. Factors entering into the variability of returns included yield of peaches per acre, the efficiency of production, and the price received for the market peaches.

Peach growers need to make a continuing analysis of the factors in their production which will economically contribute to higher yields of peaches per acre. Six of the growers had yields of over 300 bushels per acre. The yields for these six averaged 348 bushels, and were produced up to harvest at an average cost of \$.65 per bushel. Seven growers had yields of less than 200 bushels and averaged 162 bushels per acre. Their cost of production up to harvest averaged \$1.54 per bushel. The lower cost per bushel with the higher yields greatly increases the net returns to the operator for his labor as compared to the low yield - high cost group. Higher prices obtained by some growers also increased profits. Six growers averaged over \$3.00 per bushel at the farm for their crop, while four growers averaged less than \$2.00 per bushel. Quality of pack, variety and age of trees, and marketing skill were important factors in this price difference between growers."

---William J. Lord

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BRUISING OF McINTOSH APPLES AFTER HARVEST

The July-August issue of "Fruit Notes" contained an article relative to a study of the extent of mechanical injury (bruises and skin punctures) on McIntosh apples as harvested. This article deals with a subsequent study of mechanical injury as McIntosh apples were removed from storage. In this study an attempt was made to determine the amount of injury which occurs between the orchard and the packing house.

Procedure

During the packing season eighteen of the twenty orchards from which data were obtained at harvest were re-visited and the extent of mechanical injury determined on a five hundred apple sample obtained by selecting fifty apples from each of ten boxes chosen at random as they moved from the storage to the packing house.

While the apples in the five hundred apple sample from storage may not have come from the same orchard nor been picked by the same pickers as those studied at harvest time, the size of the sample was considered sufficient to fairly represent the entire crop and would warrant comparison with the extent of mechanical injury found in the orchard.

This comparison is shown in Table I on page 8.

Columns with the odd numbers show the situation for the respective classifications when the apples were harvested. Columns with even numbers show the situation when the apples were taken from storage. Note that the items in columns 7 to 10 inclusive show the total number of bruises on 500 apples rather than the percent of apples bruised or skin punctured shown in the other columns.

What do the figures in this table indicate?

1. That there was a marked increase in all types of bruises and of skin punctures when apples were removed from storage as compared with those observed at harvest. In fact, a weighted average of bruises and skin punctures for all

eighteen orchards shows that these mechanical blemishes were twice as serious on the apples when taken from storage as compared with those at harvest. In some orchards this increase was relatively small while in others it was excessive.

2. That there was a decided increase in the percent of apples in the classification "Few small bruises". While such bruises are of minor importance since they would not affect the grade, the percentage increase in small bruises shows that, in most orchards, the method of handling from orchard to packing house could be improved.

3. That, on the average, there was a particularly large increase in the type of bruises which would affect the grade and thus decrease materially the value of the crop.

4. That the percentage increase in skin punctures was about the same as the percentage increase in bruises.

5. That in the combined samples of 9,000 apples from eighteen orchards the number of 3/4" bruises and 1" bruises was in each case approximately twice as many when removed from storage as when harvested. In a few instances the number of the larger bruises was less on apples taken from storage compared with those examined when harvested. This apparent discrepancy was presumably due to the sample that happened to be chosen in each case.

Considering the number and types of orchards and the size of the sample, it may reasonably be assumed that the marked increase in bruises and skin punctures from harvest to packing house found in the orchards studied is the situation that exists in general for all orchards in the State.

If there are any lessons to be learned from this study some at least are as follows:

1. In general, there is altogether too much bruising occurring from the time apples are harvested until they reach the packing house.

2. Most pickers cause less bruising than the handlers of the apples after they are picked.

3. It would pay a grower to make random bruise counts at various stages in the movement of apples from orchard to the shipping platform of the packing house so as to determine the extent of bruising and where it is occurring.

4. The importance of reducing the number of bruises and skin punctures can be reduced to a dollars and cents basis by accepting a few well founded assumptions as follows:

1. A grower has a 15,000 bushel crop of McIntosh apples (the approximate average production of the orchards studied.)

2. Even with the careful growers 10 percent of the apples will be below Fancy grade because of bruises and skin punctures (average of the five most careful operators.)

3. This particular operator has 30% of his crop below Fancy because of mechanical injury (the approximate average of apples as taken from storage in all orchards studied.)

4. The average price of Fancy grade McIntosh is \$3.50 (Quotation from January 16, 1958 Special Apple Market Report - Country shipping point price.)

5. The average price of \$1.75 for apples below Fancy grade (an assumed value.)

Under these conditions the careful operator would have:

13,500 bushels	@ \$3.50	\$47,250
1,500 bushels	@ \$1.75	<u>2,625</u>
Total		\$49,875

The operator with 30% of the apples below Fancy would have:

10,500 bushels	@ \$3.50	\$36,750
4,500 bushels	@ \$1.75	<u>7,875</u>
Total		\$44,625

Amount lost because of excessive bruises - \$5,250

An operator with 50 percent of his apples below Fancy because of bruises (average of the five most careless operators) would lose \$10,500 compared with the careful operator. Are you losing the price of a tractor, a sprayer or possibly a mink coat for the wife because of bruises and skin punctures?

TABLE I

Comparison of Mechanical Injury at Harvest and Out-of-Storage (see note)

H Columns refer to amount of injury at harvest.

S Columns refer to amount of injury as apples came from storage..

Orchard	1	2	3	4	5	6	7	8	9	10	11	12
	Apples with few small bruises		Apples with many small bruises		Apples with 1/2 inch bruises		No. of 3/4 in. bruises		No. of 1 inch bruises		Apples with cuts and punctures	
	H	S	H	S	H	S	H	S	H	S	H	S
	%	%	%	%	%	%	#	#	#	#	%	%
2	13.4	51.0	0.2	6.2	13.6	24.0	8	37	0	5	3.0	4.8
3	10.8	60.0	0.0	7.6	4.6	23.8	1	50	1	10	1.0	5.6
4	9.2	22.6	0.0	0.6	5.8	5.6	9	7	0	1	2.2	4.4
6	7.4	27.4	0.0	0.8	4.4	9.2	5	14	1	3	1.4	2.6
7	20.4	42.4	0.0	2.8	7.3	9.4	1	9	0	5	2.6	3.2
8	4.0	23.0	0.0	0.2	2.0	4.0	2	7	0	2	0.6	1.0
9	15.8	52.8	1.0	2.2	7.6	10.8	5	9	0	4	1.0	5.2
10	13.2	50.6	0.4	7.4	7.4	28.8	9	41	4	11	2.8	10.2
11	26.8	49.8	0.4	3.6	10.0	11.4	11	15	3	1	2.6	3.0
12	17.2	49.4	0.4	2.4	17.4	14.0	30	26	1	7	5.0	5.0
13	29.2	57.6	1.6	11.6	16.4	20.6	25	32	1	2	9.2	16.6
14	35.4	50.8	5.8	9.2	23.4	23.0	32	57	3	8	5.0	4.6
15	26.6	63.0	4.0	4.8	17.6	24.8	19	29	1	8	2.8	4.6
16	7.2	33.4	0.0	3.0	2.8	14.0	1	15	0	4	1.6	6.4
17	23.4	25.0	2.4	1.0	14.6	14.2	25	20	4	1	2.6	7.6
18	40.2	59.2	1.4	13.4	20.4	29.8	13	28	2	4	1.2	7.2
19	18.8	20.8	0.4	0.0	4.6	8.0	2	15	2	1	2.8	4.2
20	8.8	15.8	0.0	0.2	3.6	2.4	1	1	1	0	0.8	1.8
Average	18.6	41.9	1.5	4.3	10.7	15.4	11.6	22.9	2.0	4.3	2.7	5.4

Note: Orchards 1 and 5 are omitted because circumstances prevented the obtaining of data as apples were removed from storage.

---O. C. Roberts

THE CIDER INDUSTRY IN OHIO

The Proceedings of the 111th Annual Meeting of the Ohio State Horticultural Society contained a summary of the present status of the Cider Industry in Ohio reported by Dr. M. P. Baldauf of the Ohio Experiment Station, Wooster, Ohio. In Ohio as in Massachusetts the cider mill operators are striving to produce a better product.

Dr. M. P. Baldauf reports that a survey of Ohio cider mills indicates that there is a trend to custom presses operated full time during the season. On the otherhand, the Ohio cider mill survey indicates a decrease in the so called "Press-in-the-woods" type cider mill. He cites several reasons for this: "(1) The consumer is more conscious of sanitation; (2) transportation of today allows a custom presser to serve a rather large area; (3) the demand for home made vinegar and fermented cider is not so large; and (4) the law enforcement agencies concerned with cider mills are beginning to enforce the laws which have not been strictly enforced in the past."

Dr. M. P. Baldauf is of the opinion that although custom pressers are doing a better job the individual pressers should not quit, because there are many instances where a private press is a great asset. He cites the following justification for a private press: "(1) Greater control of sanitation; (2) creation of an atmosphere about a sales stand; (3) personal consumer faith in an individual presser; (4) control of how and when the cider is made; and (5) lack of a good custom press within a convenient distance."

In the article, Dr. Baldauf lists a few of the undesirable practices observed during visits to cider mills which are as follows: (1) the use of badly bruised, decayed, or insect infested apples; (2) the use of dirty apples; (3) the use of wooden equipment or equipment made from corrosive materials; (4) the use of cloths that are not washed at least daily; (5) the use of containers without labels or with labels of other products; (6) Sale of fermented cider containing a sweet cider label; (7) the use of used containers and caps; and (8) containers of cider with settlings or floating material."

The Ohio State fruit growers are interested in a certified cider mill program similar to that which we have in Massachusetts. At the 111th Annual Meeting of the Ohio State Horticultural Society held last year a certified cider mill operator from Massachusetts was invited to describe the Massachusetts Certified Cider Mill Program.

Dr. Baldauf feels that a certified cider mill program would help to improve the quality and methods of cider production in Ohio. He states, "Admittedly, the cider industry as a whole is improving by producing a better quality cider under more sanitary conditions and this will help a great deal, but it is not enough. The answer is a certified cider program."

---William J. Lord

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CIDER NOTES

With the beginning of a new cider season, perhaps a look at past years activities is in order. If you can answer yes to the following questions and will do the same this year, customers will return to buy more.

- 1 - Was my price competitive and fair?
- 2 - Is my mill clean enough for customer inspection at any time?
- 3 - Do I use only clean sound apples?
- 4 - Do I blend two or more varieties?
- 5 - Will my cider hold up at least 5 days without fermenting in a home refrigerator?
- 6 - Are my press cloths clean and sweet smelling?
- 7 - Do I use hot water and a sanitizing agent to clean my press and room?
- 8 - Do I store my cider under refrigeration?
- 9 - Do I use approved methods of fly control?

As has been the case in past years, I can give limited assistance in advising on mill design, remodelling and equipment selection. Request for assistance should be channeled through you County Agent and Dr. William J. Lord.

---K. M. Hayes

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COMMERCIAL CROP OF APPLES

	<u>Average</u>	<u>Bushels</u> <u>Average</u>			<u>Indicated</u>
	<u>1943 - 1952</u>	<u>1947 - 1956</u>	<u>1956</u>	<u>1957</u>	<u>8/1/58</u>
Massachusetts	2,387,000	2,497,000	1,640,000	2,850,000	2,550,000
New England	6,246,000	6,885,000	5,020,000	7,570,000	7,800,000
35 Commercial Crop States	105,802,000	108,163,000	100,852,000	118,548,000	125,999,000

August 1, conditions indicate a commercial apple crop 6 per cent above 1957 and 16% above average, a crop of this size would be the largest since 1949. Water supplies have been adequate along the eastern seaboard which has 44% of the United States crop this year compared to 41% in 1957.

The peach crop is estimated to be the largest since 1947. The Massachusetts crop is estimated at 120,000 bushels compared with 8,000 bushels in 1957 and 79,000 bushels the 1947-1956 ten year average. The southern states estimate a crop 53% above average. The pear crop is estimated nationally 5% below average with good crops however, in Michigan and New York. Michigan 79% above average and New York 17% above average.

Short Shorts

Social Security:

Don't forget that as an employer you must keep a record of the name, address and social security number and days worked for each of your employees and whether paid on a time or piece work basis. On a piece work basis (pay by the bushel, etc.) you deduct social security tax at the rate of $2\frac{1}{2}\%$ of wages of \$150 or more during the year. On a time basis after he or she has worked on 20 different days regardless of amount paid you deduct social security tax of $2\frac{1}{2}\%$.

After any month or series of months when your tax liability reaches \$100 ($2\frac{1}{4}\%$ from employees and $2\frac{1}{4}\%$ your share) you must make a deposit using a Federal Depository Receipt (Form 450) in the Federal Reserve Bank of Boston or an authorized bank, probably your own bank.

Insurance:

You can provide insurance protection against suit for injury by your employees by Workmen's Compensation Insurance or by an employees endorsement on your Comprehensive Liability Insurance policy. These are not the same sort of protection. Your insurance agent will be glad to explain the difference and to suggest which policy might fit your risks better. Don't forget fire insurance on your crop after harvest while in storage.

---Lawrence D. Rhoades

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BEWARE OF WATER CORE IN DELICIOUS

During the last two years Delicious apples and strains of the variety have had considerable water core and in some instances this condition has been followed by internal breakdown during storage. This year with many Delicious trees carrying a light crop, growers should make every effort to minimize losses due to water core.

Delicious as well as other varieties may develop water core especially if allowed to become overripe on the tree. Large apples are more likely to have water core than small ones, although small fruits will often have some. Water core is apt to be more prevalent on trees carrying a light crop.

The question is what can be done about water core and how should the fruit be handled having this disorder. Growers should pick the fruit before it becomes too mature. Although, water core may develop in Delicious even when the fruit is not sufficiently ripe for harvest there is little doubt that the riper the fruit becomes the more water core it may have.

Lots of fruits suspected of having water core should be sold early in the season. Even though water core may disappear in cold storage internal breakdown may occur later. If it is necessary to store Delicious apples suspected of water core for a considerable period, apple storage operators should make inspection of the fruit throughout the storage season not only for the presence of internal breakdown but for other storage disorders. Regular inspections at regular 2-or-3 week intervals, starting about Thanksgiving time, would help to eliminate serious losses late in the storage period.

---W. J. Lord

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BLUEBERRY TROUBLES

During the past summer three troubles have appeared in blueberry plantings scattered over the State. They are not new but at least one has been more frequent and more serious than in the past. In fact, in a few fields it has been extremely serious. Usually this trouble is observed first during pruning. One or more dead canes are found. A look at the base of these dead canes reveals a canker which looks very much like a disease canker. On young canes the juvenile bark has turned black and the tissue beneath is brown, dry and dead. Where these cankers have completely encircled the canes, they are dead or soon die. On older canes the cankers are not so apparent. The corky outer bark is still present and covers an area from which the inner bark has entirely disappeared leaving the wood exposed. This exposed wood is dark brown or black and dead. Frequently the presence of these dead areas is revealed by a swelling beneath the bark or a split in the bark through which can be seen an irregular, light brown, corky looking mass of tissue which resembles a gall of some sort. These gall-like growths always develop at the top of the canker as if the plant were trying to callus over the wound.

While the first dead canes were observed in the early spring at pruning time, not all affected canes died so early. Canes have continued to die all summer. In some cases fruit set and developed to about one-fourth mature size before the canes died.

What is the cause of this trouble? Is it disease, winter injury or a combination? Since pathogenic fungi have been found in and around these cankers, there is evidence that the trouble is caused by a disease. On the other hand, there is evidence of cold injury. This suggests the possibility that the fungal attack was secondary, that is, the fungus invaded tissue already severely damaged by cold. It will take considerable painstaking work to get the true answer.

In the meantime what can be done where this trouble is present? The answer will have to be tentative until more is known of the cause. Affected canes can be cut out and burned to prevent spread - it is hoped - in case the trouble is a disease. To reduce the danger from cold injury less nitrogen can be used and all applied at once in the spring. Where cultivation is practiced, it can be stopped earlier and a cover crop sown to stop growth and cause the canes to harden off.

Of course the real answer to the cold injury problem is the choice of cold resistant varieties set in locations most favorable for avoiding cold injury.

A second trouble which is definitely the result of cold injury has appeared frequently this year. Small berries fail to develop and are flattened instead of round in shape. If these berries are cut open, they will be found to contain no seeds or perhaps 1 to 3 empty seed coats. Sometime during winter or early spring cold killed a very small bit of tissue, perhaps only a single cell, in the flower bud and normal seeds were not formed. Without at least a few seeds the berries fail to develop. The new varieties Bluecrop and Blueray and to a less degree Herbert are not only more resistant to this type of injury but can develop normal berries with fewer seeds than other varieties.

A third trouble has been very serious in numerous plantings this summer. When the bushes came into bloom, it was discovered that something had suppressed the development of leaf buds. The bushes were a mass of bloom with very few leaves. As a result berries were small and slow in developing. A reason for this can only be arrived at by speculation.

Among the first varieties of cultivated blueberries introduced was one named Sam. This variety regularly produced shoots 18 to 24 inches or more in length with only 3 or 4 leaf buds at the base and 15 to 30 or more fruit buds. Unless most of the fruit buds were cut off, leaving only 4 or 5, the bushes would have very few leaves and a heavy crop of very small worthless fruit.

With so much sunshine during the summer of 1957 conditions for fruit bud formation were unusually good. Many more fruit buds than normal were formed upsetting the normal balance between leaf buds and fruit buds. Unless the balance was restored by heavy cutting back during pruning the result was, as with Sam, much small fruit and few leaves.

---John S. Bailey

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FRUIT NOTES TO BE ISSUED BIMONTHLY

Please note that this issue of Fruit Notes is for September and October. We regret that due to financial circumstances beyond the control of the Department of Horticulture, Fruit Notes will be issued only six times a year in the foreseeable future.

Urgent and timely information will, of course, continue to be channeled to you fruit growers thru your County Extension Service.

--- Arthur P. French

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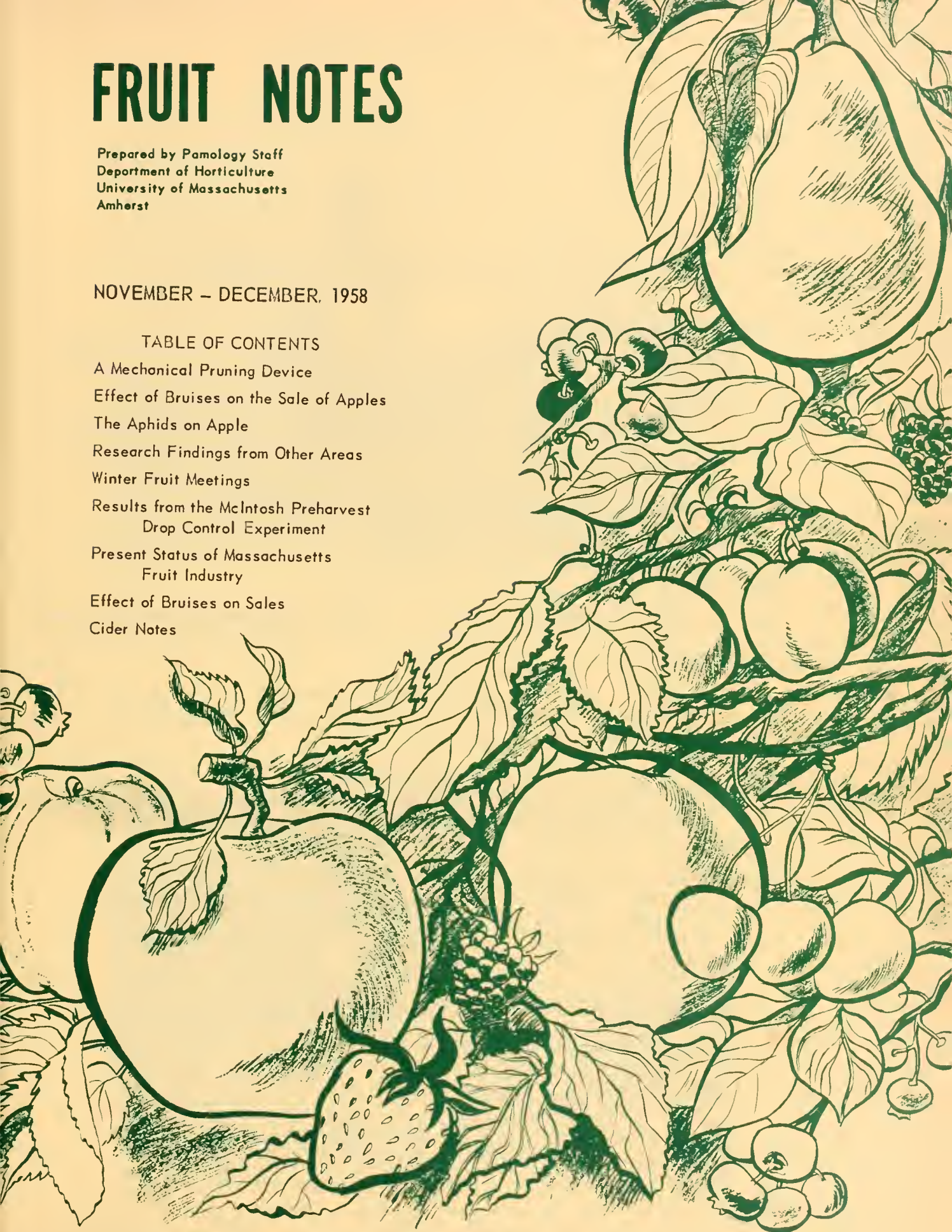
FRUIT NOTES

Prepared by Pomology Staff
Department of Horticulture
University of Massachusetts
Amherst

NOVEMBER – DECEMBER, 1958

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POMOLOGY SECTION - DEPARTMENT OF HORTICULTURE

Anderson, James - Instructor

Teaches courses in general Pomology, small fruit culture and systematic Pomology. Active in the testing of new varieties.

Bailey, John S. - Associate Professor, Research -

Doing research on strawberries, blueberries and beach plums. Mr. Bailey also does considerable extension work with growers of small fruit.

French, Arthur P. - Head, Department of Horticulture

Does some teaching in Pomology and in Plant Breeding, active in small fruit variety testing.

Lord, William J. - Extension Fruit Specialist

Chiefly connected with fruit growers' problems, other than pest control, and does research. Editor of FRUIT NOTES.

Roberts, Oliver C. - Associate Professor

Teacher of pest control, fruit marketing and other departmental courses. Currently also doing research on fruit marketing.

Southwick, Franklin W. - Professor, Research

Most of his time is spent in research on chemical thinning, preharvest drop, several aspects of storage and nutrition. Also, teaches certain advanced courses.

Weeks, Walter D. - Associate Professor, Research

Active on research in nutrition, root stocks, variety and strain tests and winter hardiness. Also, teaches certain advanced courses.

Contributors to This Issue From Supporting Fields

E. H. Wheeler, Extension Entomologist

Kirby M. Hayes, Food Technologist

A MECHANICAL PRUNING DEVICE



Mechanical pruning device showing the two hydraulic arms that are operated from a control box attached to each "bucket".



Whitney Doe of Hawbuck Orchards demonstrates their mechanical pruning device. Whit is showing the excellent maneuverability of the equipment which is operated from the control box in front of him.

O. C. Doe and Sons demonstrated their mechanical pruning device at William Hermann's orchard, Harvard, Massachusetts, one of the orchards visited on the summer fruit tour. This device is mounted on a trailer and has two hydraulic operated arms to which are attached "buckets". The pruner standing in the bucket can raise himself to the desired position in the tree by operating the controls attached to the bucket.

William Doe of Hawbuck orchards has the following to say about the mechanical pruner. "Two years ago Hawbuck Orchards decided to go into power pruning equipment. We felt at the time that in order to get the maximum efficiency out of the investment some sort of tower was needed to get the men into the trees. A platform type of tower was made which helped but left a lot to be desired. This past year with time even more pressing, we developed the "Monster" pictured with this article. It was the outcome of a collection of ideas, and proved to be a big step forward. Our feeling is that although this machine costs about half again as much as similar types it is much more efficient because two men are working and they are more mobile and time is not wasted in constant moving.

Our work pattern is to park in the middle of four trees 35 to 40 feet on centers and work one quarter of each tree at one time.

Needless to say it takes a day or two to get used to this type of machine, but we feel it is a big help and well worth the trouble to develop and make. We will be happy to cooperate with any grower wishing to build a pruning machine of this type."

---W. J. Lord

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EFFECT OF BRUISES ON THE SALE OF APPLES

Studies by the Washington State Apple Commission Show that 69% more apples can be sold through relatively bruise-free displays than from displays with moderate levels of bruising.

---O. C. Roberts

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THE APHIDS ON APPLE

Rosy Apple Aphid

1958 will be remembered as a "rosy apple aphid year". 1954 was the last such year for most of the State. In Southern Middlesex, Norfolk, Bristol, Plymouth and Barnstable Counties every year is likely to be a "rosy aphid year".

No year needs to be a "rosy apple aphid year" for you or any grower. Low cost "insurance" against this is available to everyone every year.

It requires a preventative program. The years when rosy apple aphid is likely to cause losses throughout the State cannot be predicted with any certainty. Injury occurs early, mainly before Petal-Fall, in most seasons.

(Hindsight is always better than foresight! The writer should have urged more widespread use of phosphate materials in Petal-Fall and 1st Cover sprays this past spring. The rosy apple aphid did more damage after Bloom and remained on the trees longer in 1958 in addition to being more abundant).

However, remember this! Even in 1958 growers who carried out one of the "insurance" programs did not need a phosphate soon after bloom, at a time when apples are tender and easily russeted especially under poor drying conditions.

More About The Aphid Itself

Right now (October) winged females are flying from narrow leaved plantain to apple trees. Here they produce living progeny which are wingless, egg laying females. After a mating with winged males from plantain the overwintering eggs are laid during October, November and even into December. Weather conditions during these months have much to do with the return to apple and the abundance of overwintering eggs.

The eggs are tiny, black, ovals tucked into crevices and under the bark along the trunk, limbs and branches. Each female may produce fewer than 10 eggs.

Hatching usually starts when fruit buds show from 1/4 to 1/2 inch of green tip, a stage we identify as Early Delayed Dormant. All eggs are hatched normally within a week but cooler weather may extend this considerably.

The young nymphs crawl to the leaves, start sucking the sap and cause the spur leaves to curl tightly. They are dark in color and develop rapidly into the rounded, purple stem mothers.

About the beginning of Pink these stem mothers, without mating, start to produce living young. This is at an average rate of 5 or 6 per day (maximum reported is 33) and may continue for a month. Thus a single overwintering egg may give rise to 200 rosy aphids within a month after hatching.

Furthermore, all these young aphids are females capable of repeating the feat of their mother. Also they are now well protected in tightly curled leaves. They may have already caused many "aphid apples".

A few of the above, the second generation, may have developed wings and migrated to plantain. All, or nearly all, the third generation, and all of the fourth if there are any on apple (as in 1958) migrate to plantain. Here four or five additional broods are produced before we are back to the winged migrants with which we started this story.

It is complicated life cycle involving the two host plants, one egg laying generation, three winged forms, and many broods in which are found only the non-mating females capable of producing living young.

You can see the importance of early season control to prevent injury and further build-up in numbers.

The "Insurance" Programs

You have several choices. All are based upon pre bloom applications. Costs vary; some give better control while other offer more fringe benefits against

other pests. Here they are listed from the earliest to the latest. Its up to you to check costs and to choose the program best suited to your conditions and operations.

1. Dormant - DN - butyl phenol, 1 qt./100. A drenching spray required so concentrations above 2x are often less effective. Fringe benefits: grain and green aphid eggs killed; some reduction in San Jose and oyster shell scales and red mite, better control of these and also bud moth if 2 quarts are used.
2. Late Delayed Dormant - Oil (70" superior or regular 100" superior type), 2 gallons PLUS BHC (12% gamma), 2 lbs./100. A drenching spray required so concentrations above 2x are often less effective. May fail to give complete control if egg hatching is delayed or temperatures are lower than 65°F. You obtain all of the effects of the oil against mites and scales plus these fringe benefits: grain and green aphids killed better than with oil alone.
- 3a. Up-to-Pink (in some fungicide application between Late Delayed Dormant and full Pink) - BHC (12% gamma) 2 lbs./100. May not give complete control if temperatures are lower than 65°F. Fringe benefits: grain and green aphids killed, some miscellaneous leaf eating caterpillars and sucking bugs killed.
- OR 3b. Phosphates: TEPP, 1/4 (40%) to 1/2 (20%) pt; malathion, 2 lbs; parathion (on non-McIntosh varieties), 1 1/2 lbs. Fringe benefits: grain and green aphids killed; parathion excellent, malathion good against bud moth, both good against miscellaneous caterpillars and sucking insects: malathion kills active leafroller moths, parathion fair. Avoid slow drying conditions, combinations with mercuries, and TEPP with glyodin.
4. Pink (in a fungicide application) - Phosphates as in 3b just above. Additional fringe benefits: earliest hatched red mites will be killed. TEPP may be less effective here because of leaf curling. Avoid slow drying conditions combinations with mercuries, and TEPP with glyodin.

In Case of Emergency

Its already Petal-Fall and you realize its a bad "rosy aphid year". Something should be done on all except McIntosh, Wealthy, and Duchess, even though expensive

1. Petal-Fall demeton, 1/2 pt. Avoid slow drying and combinations with mercuries and glyodin. Other aphids and mites will be killed; of little or no value against curculio.

Newer Materials for Trial

Follow manufacturer's directions in using Trithion between Dormant and Delayed Dormant (not Late Delayed Dormant or later). Promising as an aphid control, other benefits doubtful at this writing. Cost may be too great. Compatible with oil but compatibility with all fungicides not well known.

---E. H. Wheeler

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RESEARCH FINDINGS FROM OTHER AREAS

The Blueberry Industry in New Jersey

The Proceedings of the 25th Annual Blueberry Open House held in New Jersey in January, 1956 published by the New Jersey Agricultural Experiment Station contained an article by Gordon G. Butler, Statistician, New Jersey Crop Reporting Service, titled "Acreage and Production Figures from the 1956 Blueberry Survey". The information obtained in this survey should be of interest to the blueberry growers of Massachusetts.

In 1956, New Jersey growers reported a total of 6,266 acres of blueberries, bearing and non bearing, which is nearly four times the acreage reported in the last complete survey conducted in 1944. Burlington County accounted for 54 per cent of the 1956 total and Atlantic County 35 per cent. The townships of Pemberton and Hammonton accounted for 2,879 acres of the State total.

Production records for 1955 indicated that 1,619,000 trays (12 pint trays) were harvested from 5,125 acres. This was an average of 316 trays per acre. Yields as high as 850 trays per acre were reported but 1/3 of the growers had average yields between 200 and 300 trays.

Nearly 1/2 of the growers reporting harvested less than 5 acres of blueberries in 1955 and 70 per cent harvested less than 10 acres. "While small acreages predominate, large operations are an important segment of the Industry. Nearly 1/2 of the 1955 crop was produced by 59 growers, who harvested 20 or more acres each."

---W. J. Lord

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WINTER FRUIT MEETINGS

The 65th Annual Meeting of the Massachusetts Fruit Growers' Association, Inc. in cooperation with the University of Massachusetts Extension Service will be held in the Hudson Armory, Hudson, Massachusetts on January 8 and 9, 1959. 61

Gardner

Gardner

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The Following is the tentative program:

Wednesday
Thursday Forenoon, January 8, 1959 61

This Apple Maggot Situation

Prof. W. D. Whitcomb, University of Massachusetts Field Station, Waltham.

Research and Grower Experiences in Ohio with Mites, Codling Moth and Aphids.

Dr. C. R. Cutright, Ohio Agricultural Experiment Station, Wooster

Some Business Aspects of Apple Production

Dr. A. B. Burrell, Cornell University, Ithaca, New York

Thursday Afternoon, January 8, 1959

Apple Marketing Around the Country

Prof. F. E. Cole, University of Massachusetts

The New Red Delicious Strains

Prof. Edwin Gould, West Virginia Agricultural Experiment Station,
Kearneysville.

Chemical Thinning and Preharvest Drop Control

Dr. F. W. Southwick, University of Massachusetts

Financing Orchard Operations, Buildings and Equipment

Prof. L. D. Rhoades, University of Massachusetts

Friday Forenoon, January 9, 1959

There's A New Story About Oil

Dr. E. H. Wheeler, University of Massachusetts

Apple Powdery Mildew

Dr. M. Szkolnik, New York Agricultural Experiment Station, Geneva

Insect Control Recommendations for 1959

Dr. E. H. Wheeler, University of Massachusetts

Disease Control Recommendations for 1959

Dr. C. J. Gilgut, University of Massachusetts

Friday Afternoon, January 9, 1959

Effect of New Tax Laws on Rates of Equipment Depreciation

Prof. L. D. Rhoades, University of Massachusetts

New Packages for Apples

Mr. D. R. Stokes, Agricultural Marketing Service, U.S.D.A.,
Washington, D. C.

Handling and Storage of Apples in New Zealand and Australia

Dr. R. M. Smock, Cornell University, Ithaca, N. Y.

The Influence of Bulk Boxes on the Condition of McIntosh Apples

Prof. O. C. Roberts, University of Massachusetts

Apple Handling and Packaging Equipment

Prof. F. E. Cole, University of Massachusetts

--- Pomology Staff

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RESULTS FROM THE McINTOSH PREHARVEST DROP CONTROL EXPERIMENT

This fall comparative testing of 2,4,5-TA and NAA was carried out for the fourth consecutive year in a heavily bearing block (45 box average per tree) of McIntosh at Bolton. In addition to comparing 2,4,5-TA with two applications of NAA (our commercial recommendation) mixtures of NAA and 2,4,5-TA were tried. We have known that when 2,4,5-TA is effective that it may require a week or more before it shows any benefit. Therefore, if some quick acting material like NAA is added to 2,4,5-TA it might be possible to obtain good drop control for at least 3 weeks with a single spray application and still have a minimum amount of fruit ripening.

In Figure I are shown the major findings from this experiment.

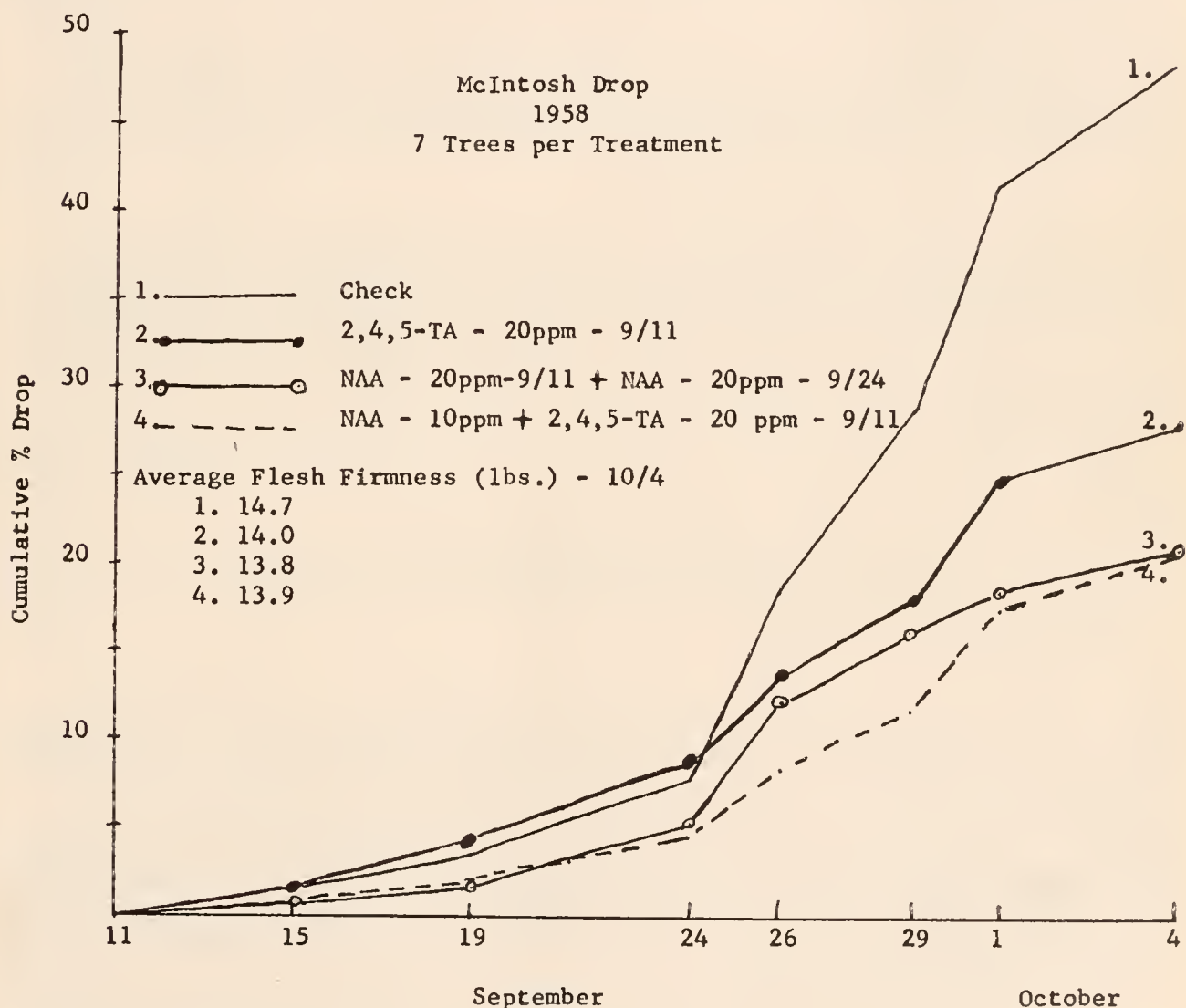


Figure I. The influence of some stop-drop materials on the rate of preharvest drop of McIntosh apples.

The data indicate that drop was not a serious problem in this orchard until September 24 to 26 when temperatures soared to the mid-eighties during the day and remained in the fifties and sixties at night. On heavily bearing trees without a drop control material (Treatment 1.) a very severe drop occurred after September 24 so that by October 4 about 50 percent of the crop had fallen to the ground. The data, also, show that 2,4,5-TA (Treatment 2.) was completely ineffective through September 24 (13 days after application) but reasonably effective, thereafter, with a total drop by October 4 of about 27 percent of the crop. Two applications of NAA (Treatment 3.) were as effective as any treatment but even this treatment was unable to prevent a 20 percent loss by October 4. From the data, however, it is apparent that our second application of NAA was delayed about 2 days too long since a sizeable loss of fruit occurred from trees receiving this treatment between September 24 and 26 (when the first treatment was no longer effective and the second application had yet to become so). A slightly earlier application of the second NAA spray might have saved about 5 percent of the crop from falling. The single application of the mixture of NAA and 2,4,5-TA (Treatment 4.) did as good a job as two applications of NAA. This mixture looks very promising but we need more experience with it to be sure of its reliability. All of the treatments hastened ripening slightly as can be seen by the averages shown in Figure 1.

In this block it is apparent, as far as a commercial application of NAA or a mixture of NAA and 2,4,5-TA is concerned for McIntosh that the initial application might well have been delayed until about September 20 since less than 5 percent drop had occurred up to that time. Since we are interested in testing materials for at least 3 weeks we generally apply treatments ahead of the best commercial timing in order to put the materials through as severe a test as possible.

---F. W. Southwick

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PRESENT STATUS OF MASSACHUSETTS FRUIT INDUSTRY

A - Analysis of the Situation

At the Department of Horticulture Fruit Advisory Council Meeting (the Council was composed of fruit growers, marketmen and University personnel) held on June 12, 1958 the general consensus was: APPLE BUSINESS GOOD - - - PROSPECT FOR FUTURE IS BRIGHT - - - CLOSE CONTROL ON PRODUCTION COSTS NECESSARY - - - EXTENSION PROGRAMS IN THE FUTURE MUST PLACE MORE EMPHASIS ON HARVESTING AND HANDLING THE CROP. The Committee felt that new plantings should be encouraged where sites and other factors indicate feasibility. In addition, they thought that continued emphasis must be given to the Certified Cider Mill and Approved Farm Stand Programs and that increased plantings of varieties of early apples are well adapted to many farms.

A study of harvesting practices in 20 McIntosh orchards during the 1957 harvest season was made by Prof. O. C. Roberts. In orchards where pickers were paid on a piecework basis 14.4% of the apples harvested had one or more 1/2" bruises while in orchards where pickers were paid on the hourly basis 4.5% of the apples had one or more 1/2" bruises. A tremendous variation in bruising of fruit by pickers was evident. Forty-three per cent of the apples picked by some pickers had one or more 1/2" bruises. The study indicated rather conclusively

that mechanical injury of McIntosh apples at harvest can be minimized by: (1) adequate supervision, (2) specific instruction of the pickers, (3) payment of the pickers on the hourly basis rather than piecework and (4) discharge of the careless or lazy picker.

The volume of McIntosh apples going into CA storage is increasing rapidly. The total capacity has increased from about 192,500 bushels in 1957 to 416,000 bushels in 1958. As the volume of CA fruit increases, it becomes increasingly necessary to store and sell from the storage high-quality-fruit if the grower expects to receive premium prices.

The control-atmosphere McIntosh apple has made many friends outside of New England. In the past the two primary markets for Massachusetts apples have been New York and Boston. In recent years, however, an increasing number of apples have been shipped to such markets as Baltimore, Washington, Chicago and Cleveland.

Labor saving devices are more necessary than ever. Not only will the grower pay more for labor, but it will become more scarce. Mechanization calls for a better grade of labor. Many agricultural communities are now in competition with industry for semi-skilled labor and the grower will have to match wages to get his labor supply.

More people are becoming customers for apples by reason of the upward trend of our population. There should be an increase in demand for apples each year. This increase in market is an opportunity we must seize or we will lose it by default to alert competitors.

New England is not the only area facing the great increase in population. The Western states from Arizona to Washington are experiencing proportionately greater increases in population. These States are also having population headaches. What this means in adjustment in production cannot be predicted accurately at this time. However, the more mouths to feed in other areas, the better for us in Massachusetts. Only 1/3 of the 1957-58 Washington State apple production came east of the Mississippi. Nearly 2,000,000 bushels went to California and about 6,500,000 bushels to the Mid-West. Figures show that it costs approximately \$1.15 - \$1.20 to ship a box of apples from Washington to the East Coast.

In Massachusetts, the suburban development has brought many difficulties from the standpoint of zoning, taxes and the loss of land. On the otherhand, the suburban developments are a boom to growers operating roadside stands.

Last year a study titled "Competition for New England Apples on the United States Markets" was published by Joseph Gartner and J. R. Bowring of the Agricultural Experiment Station, University of New Hampshire, Durham. They presented figures showing that the total United States Commercial production of apples has been decreasing at a slow and constant rate since 1934. On the otherhand, apple production in New England is on the increase. One of the purposes of this study was to determine the long-run competitive position of New England apples in 1965. Based on average per capita consumption, population trends, apple production, etc. they theorized that by 1965 New England will have decreased its surplus of apples due to the increased total consumption assured as a result of the increased population within New England and that New England apple

growers should have improved competitive position relative to growers in other regions. The analysis of the Gartner and Bowring study indicates opportunities for profitable production expansion are present in New England.

B. Problems Which Need Major Emphasis in 1959

Members of the Fruit Advisory Council and the Pomology Staff consider that the following phases of the fruit industry need further attention during the coming year:

1. Small Fruits - Strawberry nurserymen must be educated concerning the necessity of producing disease and insect free plants. On the otherhand, purchasers of strawberry plants must be educated to demand such plants.

Pruning and soil management are two problems that need continued emphasis for blueberry growers. A considerable number of part-time farmers are planting blueberry bushes and do not realize the soil management problems involved with such a crop.

Fumigation for black root rot of strawberries has been shown experimentally to result in an increase of about 2,000 quarts per acre in favor of soil fumigation. In Southern Plymouth County there are a number of strawberry growers whose plantings range from a small garden patch to about three-fourths of an acre. These are mostly located in the town of Wareham and Carver. The area owned by each grower is usually no more than two or three acres. The total area involved is probably between 25 and 50 acres. Strawberries have been grown in these same fields for many years. Growth is now poor and there are many blank spaces. The appearance suggests soil nematode trouble. In a few fields checked, nematodes have been found. Unless something is done, many of these growers will have to stop growing strawberries. Some soil fumigation demonstration trials might help, plus the use of disease-free planting stock.

2. Harvesting the Apple Crop - The grower needs to become more bruise conscious. Much greater emphasis on proper harvesting and handling of apples through orchard visits, meetings, demonstrations, etc. must be made by the extension personnel.

3. Increase the Efficiency of Fruit Production - In every field of the fruit growing operation there are increased costs making labor saving devices more necessary than ever.

4. Farm Management - Basically, the major objective of the fruit farm management program is that of stimulating growers to think through their problems in order to make sound managerial decisions.

5. Storage Disorders - The last two years considerable breakdown has been found in some apple varieties particularly Delicious. This breakdown appears to be associated with water core. More emphasis is needed on cold storage disorders and their control.

C. Other Problems Need Emphasis in 1959

1. To obtain more participation in the Cider Mill Certification and the Approved Farm Stand Programs.

2. Stress the importance of good soil management practices of tree and small fruits.
3. To encourage growers to train young trees and to stress proper pruning of small fruits.
4. Chemical thinning.
5. Mouse Control
6. Evaluation of new varieties.

--- W. J. Lord

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EFFECT OF BRUISES ON SALES

One reason why apples do not sell as rapidly as they might is indicated by research work recently done in Virginia. In a study of consumer preference for apples it was found that 60% of consumers did not want apples even with bruises less than 1/2 inch in size. 91% did not want to buy apples with bruises 1/2 inch and larger.

Research in Massachusetts shows persistently that more McIntosh apples fail to meet the requirements of fancy grade because of bruises than from any other cause.

Careful handling results in fewer bruises, improved consumer acceptance, more sales, more money in the grower's pocket.

O. C. Roberts

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CIDER NOTES

Blends

The blending or mixing of apple varieties can improve cider tremendously. Very few mills produce a single variety cider intentionally with the possible exception of a Roxbury Russet cider. As a guide to blending, the following breakdown of apple varieties can be used to advantage:

- (1) Sweet Subacid
Delicious
- (2) Mildly Acid to Slightly Tart
Baldwin, Greening, Rome Beauty, Winesap, Jonathan, Stayman,
Northern Spy, York Imperial, Wealthy and Cortland
- (3) Aromatic Group
Golden Delicious, Winter Banana, McIntosh, Russet
- (4) Astringent Group
Crab Apples: Florence, Hibernial, Red Siberian, Transcendent,
Martha, Hyslop
- (5) Neutral Group
Ben Davis, Black Ben, Gano, Willowtwig

When blending, use very small quantities of Group 1 and 5 if at all, small amounts of Group 4 for tang, and the majority of varieties in Groups 2 and 3. Always try to have 2 or more varieties in the cider, preferably one from Group 2 and one from Group 3.

A popular mixture is 50-60% McIntosh, 20-30% Baldwin and the remainder from other varieties. Attempt to standardize your formula, but keep in mind that maturity can affect the final product as well as your mixture.

Brushing or Washing

Recent conversations with mill operators and Food and Drug officials indicate that the need for brushing and/or washing needs more attention. Brushing is the preferred method since washing may not do as good a job and could lead to watering the cider. Brushing has been adopted as a requirement for the Certified Cider Program starting in 1959. Plan now to include brushing as an integral part of your cider operation.

Cider Bulletin

Indications are that the new United States Department of Agriculture Cider Bulletin will be available for distribution within the next several weeks. Photographs in it will show several Massachusetts locations and products. If you would like a copy, let me know.

---Kirby M. Hayes

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Effective December 1, 1958, Professor John S. Bailey will be stationed at Amherst instead of East Wareham. He will continue to be the leader of our small fruit research program.

---A. P. French

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FRUIT NOTES

Prepared by Pomology Staff
Department of Horticulture
University of Massachusetts
Amherst

JANUARY - 1959

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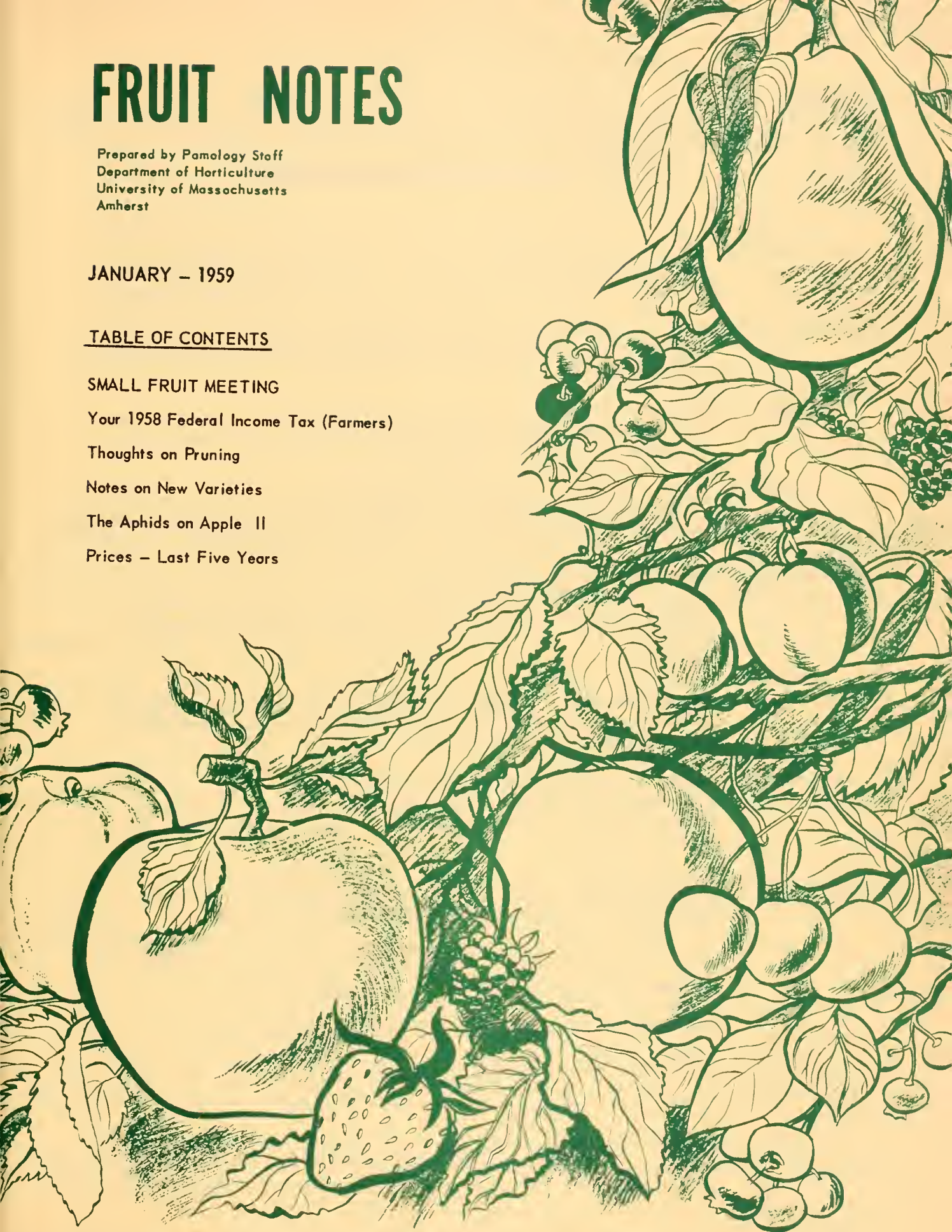
Your 1958 Federal Income Tax (Farmers)

Thoughts on Pruning

Notes on New Varieties

The Aphids on Apple II

Prices - Last Five Years



Publication 380 has three sections, the first of which reviews the practices followed by growers in servicing the retail food stores and the apple merchandising procedures of these stores.

During the course of the study, the authors observed situations and practices not specifically investigated in the study itself which might be helpful to growers who are contemplating store servicing. In the opinion of the authors some of these observations are worthy of consideration and are discussed in the second section of the study.

The third section of the publication contains suggestions for apple growers who are marketing apples directly to retail stores. The suggestions are based on the findings in the study and other available research data, observations of practices of growers and store operators, and other information on the marketing of agricultural products.

---William J. Lord

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RESULTS OF THE F. F. A. FRUIT JUDGING CONTEST

The annual winter fruit judging contest was held January 9th at the Gardner Armory in conjunction with meetings of the Massachusetts Fruit Growers Association. Teams representing Essex Agricultural and Technical Institute, Narragansett Regional High School, Norfolk County Agricultural School, Wachusett Regional High School and Worcester North High School participated in this contest. Team honors were won by Narragansett Regional High School.

The three boys having the highest combined scores, from this contest and an earlier one held at the University, were chosen for the State fruit judging team and received both medals and cash awards. Donald Robbins and Cyrille Allain of Narragansett and William Rudd of Essex were recipients of these awards.

The contest includes the identification of varieties, the U. S. grades for apples, and insect and disease specimens and blemishes. This contest provides excellent training for young men interested in the growing and marketing of fruit.

Much praise should be given to the M. F. G. A. for their continued support in providing the space and the cash awards for this winter contest.

---James F. Anderson

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